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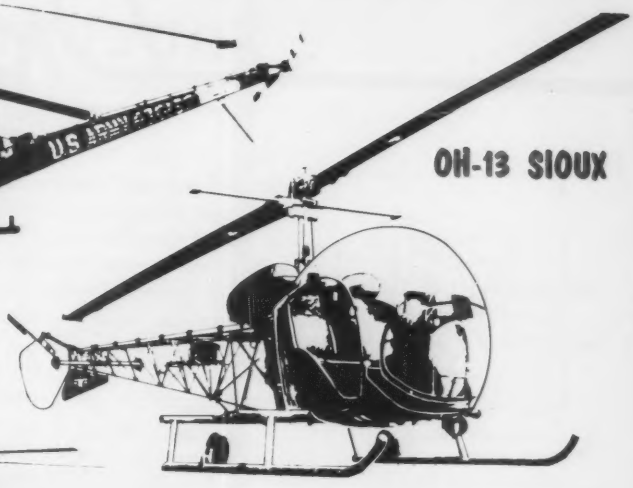
UNITED STATES ARMY

DECEMBER 1977

AVIATION DIGEST

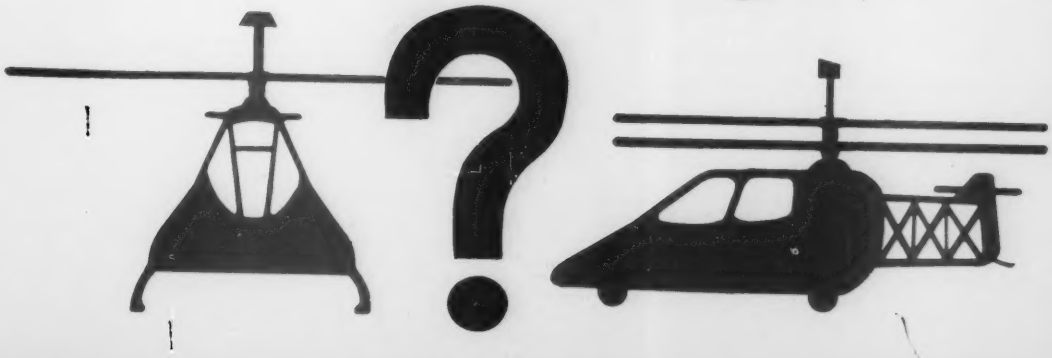
OH-23 RAVEN



OH-13 SIOUX

OH-6 CAYUSE

OH-58 KIOWA



UNITED STATES ARMY AVIATION DIGEST

DECEMBER 1977 VOLUME 23 NUMBER 12

8

Air Cavalry Hardware Of The Future, COL George W. Shallcross 1
Just Another Demonstration, CW2 Darrell Wiebesick 6
Short, Violent Warfare, CW3 Chuck Tidey 8
New Approach To Human-Error Accidents 10

14

The Indispensable Scout, BG David K. Doyle 14
EPMS Corner: Returning From Overseas Duty, SFC Douglas E. Allen 18
Nebraska National Guard, CPT Robert B. Robeson 19
Just Thunder 24
Air Traffic and Airspace Officers Educational Seminar 30

36

OPMS Corner: ACIP And Aviation Personnel Update, MAJ Thomas M. Walker 31
MSAW At Fort Rucker, PFC Mike Ball 32
What Do You Do? Why Do You Do It?, CPT Charles K. Griffin and CW4 John C. Moodt 34
Molting Season: The Cobra Gets New Fangs, Joe Ruggerio 36
Radar Myth Conceptions 38
Views From Readers 41
A Fine Line 43
Pearl 46
ATC Action Line 48
Army's First Air To Air Symposium ..... Inside Back Cover

46

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ABOUT THE COVER

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The mission of the *U.S. ARMY AVIATION DIGEST* is to provide information of an operational, functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, aviation medicine and other related data.

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AIR CAVALRY HARDWARE OF THE FUTURE

COL George W. Shallcross
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The author reviews a typical air cavalry combat operation in Vietnam. Remarks on employment, tactics and techniques of that operation introduce a discussion of the uses of projected technology to assist the air cavalry combat leader of the future. Emphasis is placed on improved equipment rather than tactics or techniques. The article is restrictive in nature and does not attempt to cover the entire spectrum of research and development projects, but only an extrapolation of those items directly related to the events taking place in the opening review. Although this article is authored by the TRADOC System Manager for the ASH, it in no way necessarily reflects positions of any Department of Defense agencies.

LOH PILOT: "Taking fire! Taking fire!"

Cobra pilot: "Inbound."

Those who were involved in air cavalry operations in Vietnam well remember the electrifying exclamations from the light observation helicopter (LOH) pilots (scouts) and the deliberate matter of fact statement – which was the expected response to let scout pilots know that help was on the way – from the AH-1 Cobra gunships.

The feeling of closeness and comradeship that was established between gunship and scout pilots is not measurable. It grew on the Vietnam battlefields and exists in Army aviation today, strong and healthy. It is an intangible asset that is "counted on" in the development of air assault operations. To understand the meaning of this rapport between scouts and guns, let us return to the initial alarm of taking fire and the subsequent events that took place.

LOH pilot: "Taking fire! Taking fire!" Upon seeing or hearing the incoming enemy fire, the scouts returned fire to the enemy, or in the direction from which fire occurred. Simultaneously, the observer threw a smoke grenade to identify the enemy position while the scout pilots made an abrupt maneuver away from the area. They knew that 17-pound rockets were about to smash into their location.

Cobra pilot: "Inbound." The Cobras, already inbound, fired a mixture of weapon systems to include high explosives, antipersonnel and 20 millimeter (mm) cannon.

After the firing passes, the scouts who had been directed to hold in a secure area were ordered by the air mission commander (AMC) to return to the enemy position.

Because they remained low level, target orientation was difficult. Further, because they returned over a different flight path route, the scouts had to be guided similar to a ground-controlled approach to reenter the area. They assessed the results of the Cobra strike, continued to conduct reconnaissance, and maybe received fire again, probably in that order.

If the enemy contact was significant and the threat was great enough to justify troop insertions, the AMC, in coordination with the ground commander, could make the decision to insert troops and develop the situation. The scouts again were withdrawn and the Cobras contained the enemy while the AMC alerted the troop lift helicopters by radio and ordered them to load their troops and get airborne. The AMC gave the lift helicopter leader a coded transmission indicating the location of the contact and general information about the area, including an approximate inbound heading to a landing zone (LZ).

Meanwhile the scouts were reconnoitering for a suitable LZ for the lift helicopters and marked the LZ at the appropriate time with smoke for identification.

The Cobras rendezvoused with the lift helicopters and escorted

them to the LZ. The Cobras then conducted firing passes on suspected or known enemy locations to protect the precarious troop insertion, especially during the vulnerable time while the troops were offloading.

The AMC was able to conduct combat operations in Vietnam this way, but the AMC would need help to conduct the same type operations in a higher level of combat intensity. There is a need in future combat for greater use of technology to assist the air cavalry combat commander in controlling or directing combat assets. There also is a need to improve the capability to seek and destroy enemy forces. For example, in conditions of poor visibility or darkness, the significant reconnaissance capability of the scouts is negated.

Even the best trained observers cannot function well at night without the use of night vision aids. During periods of poor visibility or rain, scouts cannot see well enough to fly as a team and gunships cannot maintain the effective visual contact that is necessary to protect them. So obviously, a need exists to more effectively exploit those intangible assets – the teamwork, courage and skill between scouts and guns that is inherent in all air cavalry units.

With these thoughts in mind *let's return* to the LOH and Cobra pilots in a combat situation and project it into a future air cavalry combat action extending the technology of today into equipment of the future. The LOH pilots become scouts and the Cobra pilots become attack helicopter pilots. *Do not consider this scenario with idealistic conceptions, but with a realistic probability that a limited number of current or projected research and development projects will materialize.*

The scouts in this projected action may or may not be taking fire as they contact the enemy because the tactics employed differ from those used in the past. Improved range target acquisition/designation systems combined with advanced weapons standoff capability will also have tactical impact on the possibility and severity of taking fire. The simplistic wagon wheel reconnaissance tactic with the overwatch protection of the scouts by the gunships will long have been replaced by the tactical space controller (TASAC) and scout/attack helicopter mix concept. This concept greatly increases the responsibility of the scouts so that scouts will become the keystone of aerial employment of the combined arms team. The TASACs will be responsible for conducting and orchestrating the battle in their respective area of operations.

The TASACs will not only employ the air cavalry and attack helicopter teams in antiarmor roles, but they also will support with the ground commander by applying destructive/suppressive artillery fires and tactical air support. The role of scouts will have reversed from the Vietnam era and will control the actions of the attack helicopters. The scouts will have the responsibility of employing the elements of the destruction/killer teams by selecting the kill zone for their teams and establishing and maintaining contact with enemy forces. This will be accomplished by acquiring and handing off targets to the attack helicopters and distributing fire within each team.

The air cavalry scout of the future will operate day and night outside the effective range of enemy AA weapons

Scout pilot: "Taking fire! Taking fire!" As the TASACs and scouts employ their tactical assets they will be flying in highly maneuverable helicopters constructed primarily of composite materiels and high strength metals.

The composite materiel construction of the scout will serve a dual purpose which not only will allow a lighter, stronger aircraft, but also a ceramic metal combination will provide protection for the crewmembers and key flight and engine components.

The aircraft will be powered by a lightweight, high lift-to-weight-ratio engine that will allow immediate response to flight controls. The aircraft will be designed to permit maneuvers restricted only by human limitations. It will be an adverse weather aircraft with instrumentation visually displayed on the windshield or canopy for night and instrument navigation.

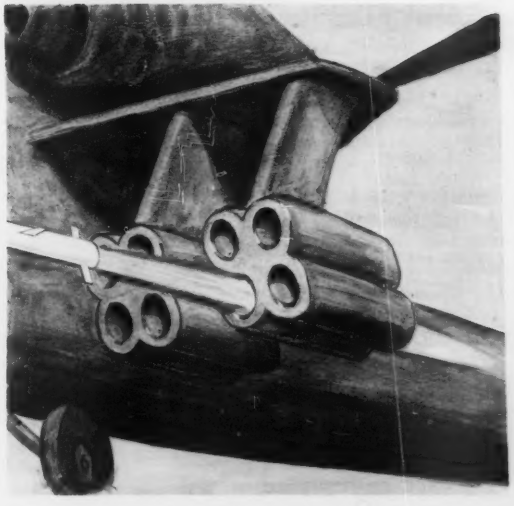
One of the assets the future scout will have is a night vision capability. The continued development of equipment, such as the target acquisition and designation system, will give the scout's crewmembers the ability to detect the enemy at night as well as day.

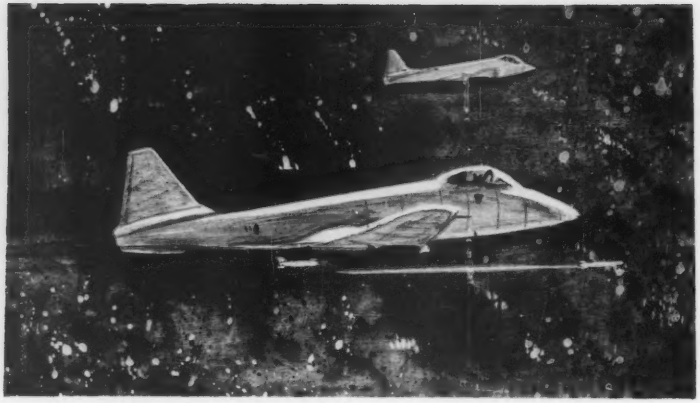
This improved system can operate in total darkness. Since it detects differences in temperature, it identifies both camouflaged personnel and equipment in daylight. It also will be an integral part of the pilot's visor. But of greater importance to the scout pilots will be the capability to see through light haze or fog.

Although the scouts may have improved detection capability an enemy may still take them under fire without being seen. Receiving fire from an unseen enemy will continue to be hazardous. But future scouts will be equipped with detector-sensor equipment that will determine from which direction the fire is coming and also its caliber.

This sensor equipment will be incorporated with advanced development of the target acquisition and designation system. Using a laser ranging and tracking system, the scout will detect the position from which the firing is originating and illuminate the position with laser. This will afford inbound attack helicopters a greater capability for an accurate first-round hit. Attack

Scouts will designate targets for destruction to missile carrying attack helicopters; the attack helicopter acquires the designated target and launches a tank killing missile





High performance tactical air support is fully integrated into the ground battle

helicopters will be able to use pinpoint rather than area type ordnance, thus destroying more enemy targets with less ammunition and providing greater protection for the scouts.

The beauty of the laser-detector sensing equipment is that it will be operated automatically. The target can be illuminated even though the scouts may be flying away from the enemy's firing position.

Attack helicopter pilot: "Inbound." As the attack helicopters are inbound and aiming their weapon systems at the laser designated targets, the pilots will feel a sense of confidence with the knowledge that improved fusing and weapons effects will rain greater lethality on their targets. The additional improved accuracy will give their ordnance remarkable kill assurance.

Assisting the attack helicopters will be the much improved forward looking infrared system (FLIR), an integral part of the weapon systems. It will be miniaturized and much more effective than today's prototypes.

The viewing screens of both the pilot and copilot will be far clearer and sharper than current television and have extended range and an improved amplification capability. Attack helicopter crewmembers will be able to observe accurately their strikes and adjust accordingly.

Coupled to the attack helicopter FLIR system will be a receiver for the Persistent Laser Painters that the scouts will use to "mark and forget" targets. The reflected laser energy will be picked up by both special trackers in the aircraft and laser seekers mounted in the ordnance of the attack helicopter. This ordnance will employ a "fire-and-forget" missile with a warhead mix of high explosives, antitank, antipersonnel flechettes.

In this scenario the detector sensor on the scout will identify the type of fire being received. This information will be transmitted to the selective effects armament subsystem in the attack helicopter, which in turn automatically selects the specific warheads to counter enemy fire. By using these advances in technology, the attack helicopters will have greater standoff capability because they will only have to turn inbound to the target, stabilize, fire and break.

If during combat operations the need arises to insert troops the TASAC will direct the scouts to reconnointer a landing zone. After making their clearing sweeps, they will drop in the LZ a recoverable portable transmitter that incorporates an omnidirectional and distance measuring device that simultaneously transmits azimuth and distance to the receiver in the troop lift helicopter.

Before the lift helicopters receive signals from the LZ, the TASAC will have alerted them that their services are required by the simple push of a transmitter switch which in turn will illuminate a light on the lift helicopter console. The TASAC will have selected various precoded bits of information such as inbound heading to the LZ; wind direction and velocity; whether or not the lift helicopters will be permitted to fire their protective weapons during the insertion; and the direction of egress from the LZ.

A lighted interpreter on the lead lift helicopter's console will indicate the coded information, and the troop insertion may be made without extensive radio traffic. If the portable miniature transmitter was damaged when dropped into the LZ, the scouts also can identify the LZ by the use of a hand-held laser designator. The laser-detector sensor mounted on the scout also may be used to indicate to the TASAC their position during periods of inactivity plus possible ship to ship communications.

All in all, once the scouts receive fire or identify targets, there will be no requirement for radio transmissions during subsequent fire support, LZ reconnaissance or troop insertions. Command and control will be more responsive with fewer transmissions, and coordination with artillery support or tactical air will be simplified.

The portable transmitter dropped to mark the LZ and guide the troop lift helicopter also will

assist tactical air support. This device will eliminate the necessary target identification normally required from the TASAC to identify the target and distinguish between friendly and enemy forces.

The concept of this procedure will be to simply transmit to the tactical air support assets on which frequency the transmitter is operating and indicate the radial bearing and range of the enemy from the transmitter. Tactical air support pilots may expend their ordnance without additional target information. The key to success will be speed and coordination effected by well trained, dedicated air cavalry and attack helicopter teams.

To add effectiveness to aerial fire support of the future, attack helicopters also will be armed with antipersonnel and antimateriel weapons. Each attack helicopter will carry a mix of weapons and weapons systems, allowing for greater flexibility engaging targets. There will be a turret mounted 30 mm gun loaded with mixed ammunition and a rocket system evolving from 2.75 inch rockets that will include armor piercing, high explosives, flechettes, and an illumination round. Ammunition will be conserved because the proper ordnance will have been selected for the type target engaged.

A possible rotor concept that could be common to all types of air cavalry aircraft will be the advancing blade concept (ABC) using rigid rotor principles. The construction of future helicopters from high strength composite materiel will permit the use of this concept without sacrificing any of the pure helicopter capabilities and yet permit high speeds when required.

The rigid rotor will provide improved maneuverability required by the scouts, allow greater gun platform stability for the attack helicopters and permit lift helicopters the rapid reaction speed necessary for troop reinforcements or insertions.

The TASACs employ destructive/suppressive Artillery fires to support the ground commander

The advancing blade concept design envisions a coaxial, counter-rotating rotor which will eliminate the present tail rotor configuration and all of its associated weight and parts. Although the ABC system will weigh more than a conventional helicopter rotor system, the improvement in efficiency and performance will more than make up for the additional weight.

Another possible rotor concept, a quantum jump in rotor technology, is the hingeless bearingless rotor (which also is a rigid rotor). This advanced system permits the same maneuver capability as the ABC. However, the smaller rotor hub reduces radar reflectivity and the lack of hinges and bearings cuts maintenance requirements tenfold. Blade construction permits the incorporation of specified weights which by increasing stored energy will eliminate the dead man zone in the event of engine failure.

Also common to future air cavalry aircraft will be an advanced integrally designed infrared suppression capability; ballistic tolerance; and radar reflectivity reduction. Avionic repair and improved modular maintenance repair will be conducted at the refueling and rearming point.

In Vietnam, after the scouts reported receiving fire, the gunships turned inbound and took several seconds to stabilize, sight and fire their ordnance. With the advancement in friendly as well as enemy technology, targets will have to be identified more rapidly and taken under fire and/or destroyed in much less time than in the past. This *several-second* luxury can no longer be afforded. Aerial fire support will require immediate responsiveness, and training for this responsiveness will have to be an integral part of the weapons system and team effort.

The human-machine interface is a must, and the air cavalry of the future will be ready for the challenge.

The future air cavalry trooper – forming a major part of the strike forces – may take the time, after bringing an enemy contact situation to a successful conclusion, to reflect and say as the Cavalry veterans of Vietnam often did: "Yes, sir; this Cav is all right!"

USAAAVS

CW2 Darrell Wiebesick

Just Another Demonstration

WHEN YOU ARE a member of the Army's unique helicopter air crash rescue unit, demonstration missions are a way of life. This demonstration was to turn out quite differently from the rest. Five people would come face to face with death in one of the most unusual emergencies ever experienced by an Army flight crew.

I was assigned as copilot for the mission and that day in May started out like hundreds of days

before. The demonstration was scheduled for 1600 hours at the fire pit located 1,150 meters east of the airfield's control tower.

After several practice missions, we were set for the demonstration. We executed a crash rescue mission type "scramble" takeoff while the ground crew lighted the 400-gallon JP4 spill in the firepit. Since this was a mission demonstration and the winds and density altitude were favorable, the pilot elected to make a downwind takeoff and approach to place the aircraft in the optimum position for the crash rescue/fire suppression sequence.

While turning from base to final in a descending right turn, the pilot asked me to turn on the tank pressure. Immediately after I turned on the pressure, we felt light water foam hitting us on the back of our necks. The crew chief advised us that we had a leak in the right tank. Before I had a chance to turn off the pressure and open the flow valve, the foam had started to cover the windshield from top to bottom. The pilot immediately applied power to stop the descent and made a left climbing turn to head toward the airfield and, more importantly, away from the trees, powerlines and the raging inferno in the firepit.

No sooner had the pilot leveled the aircraft at 200 feet agl than his vision was totally obscured by the foam on the windows and his helmet visor. While the foam had completely covered the instruments, gauges, radios, and windshield, I had some forward vision out the left chin bubble and took the controls. I made a Mayday call to the tower and advised them we had a blown tank. The tower gave us immediate landing clearance and notified the crash trucks. When I saw the runway pass between the pedals, I made a left turn and lined up with it. Later we learned we had just missed a jet aircraft that was on takeoff. Fortunately, we did not encounter any wake turbulence which could have really compounded our problem.

I had just initiated the approach when I became aware of the medic and crash rescue specialist screaming. They could see out the cargo doors but could not help. How terrified they must have felt knowing they had only seconds before we crashed.

The foam was up past our waists when we saw the master caution light come on under the foam. The pilot tried to find the segment light but it was useless because foam was filling the cockpit too fast. When I could no longer see out the chin bubble, the pilot tried to jettison his door. It failed to jettison so he resorted to holding it open. We knew that without some forward vision, we could not expect a controlled crash landing.

In spite of people trying to talk to us on all three radios, we somehow managed to talk with one another. Through blurred vision, the pilot was giving me some idea of our attitude, altitude, and ground speed. If his vision held out, we might make it. All of a sudden, foam started collecting on my sunglasses. I tightened my death grip on the cyclic as sweat ran down my face, and my eyes started burning from foam. I realized that if we didn't land in the next few seconds, I would lose all control due to the intense pain in my eyes. The pilot's calm voice kept reassuring me as we continued to descend.

Even though I finally lost complete vision, with the pilot's help I was able to level the aircraft and slow the speed just before impact. We hit the sod just to the right of the runway and skidded to a stop in 25 feet. I could no longer see, so the pilot performed the shutdown as the other two crewmen helped me from the aircraft. No one was injured and my vision returned shortly after a fireman washed my eyes with water.

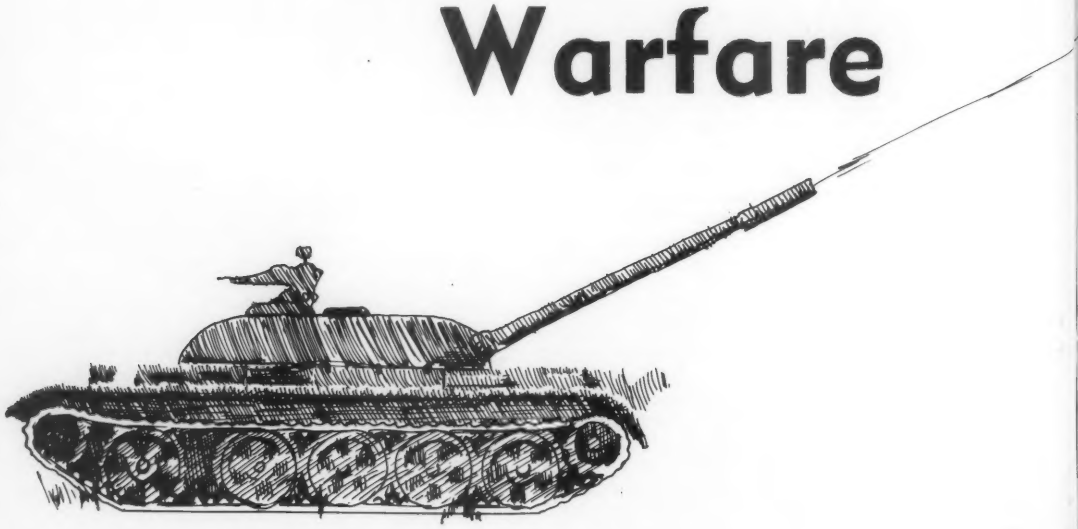
After landing, the inside of the aircraft looked like the inside of a washing machine that had too much soap powder poured into it. We had to replace some of the radios and instruments damaged by the foam. There was no structural damage, but we did have problems with corrosion. The master caution light was caused by the foam shorting out the caution panel.

Investigation revealed that an O-ring seal on the cap of the right tank had failed, allowing the light water to escape. A fifteen-cent part had caused a one-minute-and-forty-five-second emergency that gave five people a brush with death they will remember the rest of their lives.

Since that day, the pilot has been known as Speedqueen, while I was nicknamed Maytag. We look back and chuckle at what could have resulted in a disastrous accident.

Mr. Wiebesick, a maintenance technician, is rated in the OH-58, UH-1, and AH-1. He is presently enrolled at Embry-Riddle Aeronautical University, Fort Rucker, under the Warrant Officer Advance Degree Program. Mr. Wiebesick and CW2 Willard G. Rusk received the Broken Wing Award for the way they handled the emergency described in this article.

Short, Violent Warfare



LOOKING BACK over the last decade (1967-1977) it appears that there is a new trend developing in regards to the length and ferociousness of the wars being fought around the world.

In 1967, Israel and most of the Arab countries fought a very short – 7-day – and quite violent war. The brunt of the fighting in this war was carried by the armored units on both sides. The war was brought to an end through the political intervention of the so-called super powers – the United States and the Soviet Union – who, oddly enough, were also the major suppliers of the antagonists.

The next war was in 1968 and though it wasn't as violent in nature it was quite short in duration. This war, or perhaps conflict is a better word, was the Soviet Union's occupation of Czechoslovakia. Once again, the thrust of the invading Soviet forces was conducted by its armored units.

October 1973 brought with it another Arab-Israeli war. This one lasted a bit longer than the 1967 confrontation. Here again, armored units were the work horses and also the decisive element in the fighting. As they were in the 1967 war, the major suppliers of armaments were the United States to the Israeli forces and the Soviet Union to the Arab forces. This war also was brought to a peaceful settlement by the political intervention of the two super powers.

In 1974, this trend of short, usually violent wars, being brought to an end by political intervention by outside forces began to change somewhat. In early 1975, the armies of North Vietnam struck out boldly against the South Vietnamese forces. By April of 1975, the North Vietnamese Army, led by its armored units, had overrun South Vietnam and the South Vietnamese government fell. The change in the trend here is – there was a decisive military victory which resulted in a change of government for the conquered country.

In 1976 this same trend con-

CW3 Chuck Tidey
Avionics Laboratory
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tinued in Angola. Here the bulk of the fighting was terminated in just a couple of months and like Southeast Asia in 1974, the war was brought to an end via a decisive military victory.

I'm bringing all of this up, not to give you a quick history lesson concerning the wars fought around the world during the last decade, but rather to make you aware of the trend of recently fought wars towards being short in duration. These wars have lasted anywhere from 1 week to 2 months, and are very violent in nature. Though I've not gone into detail in the above descriptions of the various wars, it should be noted that in almost all the wars it was a combined-arms-team army that battled another combined-arms-team army. Also, in almost all of these wars, armored units spearheaded the attacks.

So where does all of this leave us? Well, let's take a quick look. Two of the U.S. Army's Big Five procurement projects (the XM-1 main battle tank and the AH-64 advanced attack helicopter) are designed to give us a decisive edge on the battlefield should the need ever arise for us to again go into combat. Improved night vision equipment like the night vision goggles (AN/PVS-5) and the forward looking infrared (FLIR) are being procured for our ground and aviation personnel so that we can fight these "first battle" type wars on an around the clock basis. To complement this equipment, however, we must have an Army that is fully prepared to go into combat at any time. And that is the major point of this entire article: Are *you and your unit* really prepared to go into combat on just a couple of hours notice?

At first, probably out of esprit de corps, I'm sure most of you answer yes. You and your unit are combat ready right now! But think about it, are you really ready? Are *you* personally in good physical condition (have you run your 1, 2 or 4 miles today?); are your shots up-to-date; how about your teeth, do you need dental work? When was the last time you qualified on a range with your weapon; or how about your family, are they mentally, physically and financially prepared to operate without you for a sustained period of time?

And how about your unit? Do you have the personnel on hand to accomplish your unit's mission or are you simply holding a handful of unfilled requisitions? Is your unit's authorized stockage (ASL) and prescribed load list (PLL) in good shape for immediate deployment, or does your supply troop just show you that it has been requisitioned but nothing has been done about it since? Are your motor vehicles and/or aircraft ready to go into combat on a sustained basis and on short notices? Are all of your assigned personnel qualified and current in the job to which they are assigned? If not, what is being done about it?

Only you and the people in your unit know the answers to these questions. But remember this – your superiors and, in fact, the rest of the world may one day soon find out the true answers to these questions because the next war may well turn out to be a "come as you are" affair.

New Approach to Human-Error Accidents

THE PURPOSE OF this article is to point out some of the recurring deficiencies noted in aircraft accident reports (DA Form 2397 series - Technical Report of U. S. Army Aircraft Accident). Since the majority of these deficiencies involve the human-error investigation, we will begin with a brief review of the human-error problem and a new approach we hope will be successful in attacking it.

Formerly, pilot error was approached in the context of specific types of accidents such as hard landings, midair collisions, and blade strikes. This type of approach considered the situation in which the accident occurred instead of the causes that brought it about. As a result, causes that are common to different types of accidents were overlooked. Preconceived types of accidents tended to foster preconceived notions of what happened and why it happened. In summary, this approach fostered the tendency to describe and account for accidents rather than to discover their causes and cures.

In developing a new approach, it was necessary to get back to basics by first defining the problem. Figure 1 presents a functional definition of the human-error accident. Items one through twelve are the basic elements of the aviation system. When one or more of these elements is out of tolerance, an overload (item 13) is placed on man's system role (item 14) in that he must continue to perform his normal tasks while correcting or adjusting for the abnormal system condition. When this overload exceeds his ability to cope with it or occurs at a critical time, he makes errors (item 15) in his normal tasks in handling the abnormal system condition. Most of these errors slip by without causing an accident (item 16). But when events or circumstances operate unfavorably, the error leads to an accident (item 17).

It should be emphasized that the overload placed on the man's system role:

- May originate with the man through his psychological (item 11) and physiological (item 12) limitations, e.g., inattention, fatigue.
- May be imposed on the man through out-of-tolerance conditions among the other aviation sys-

tem elements (items 1 through 10), e.g., improper maintenance causing an overload in the form of engine failure.

• May be both originated by the man and imposed on him, e.g., impaired performance due to fatigue which resulted from a supervisory requirement to exceed flight-time limitations.

The new approach views human-error accidents as the result of man's system role being overloaded by inadequacies of the man, other system elements or both.

With the model developed, the next step is to transform it into an approach to the investigation, analysis, and prevention of aircraft accidents caused by human error. Table 1 presents the outline of an approach that asks each accident investigation board to answer: What has happened, What caused or allowed it to happen, and What to do about it (3W) with respect to man, machine, and environmental causes of accidents. It can be seen that TEIR is the acronym for the 3W approach to the investigation, analysis, and prevention of human-error accidents. The elements of TEIR are defined and discussed as follows:

1. Task error (TE) - job performance deviating from that required by the operational situation. "Required performance" includes that stipulated by (a) school training, (b) on-the-job training, (c) Army-wide regulations and guidelines, (d) standing operating procedures, and (e) commonly accepted practices. An error is assigned only when it is judged that a person of normal or reasonable competence could have performed the task correctly in the existing operational situation.

2. System inadequacy (I) - an element of the Army aviation system that did not operate as intended or designed. A system inadequacy is assigned only when it is judged to have caused, allowed, or contributed to the occurrence of a task error. More than one system inadequacy may be assigned to a given task error.

3. Remedial measure (R) - action required to correct or reduce the operational impact of a system inadequacy. A remedial measure is assigned when it is judged appropriate for the system inadequacy. The remedial measure may be directed at any command level for implementation and is not to be restricted by current technology or budgetary, personnel, and equipment resources. More than one remedial measure may be recommended for a given system inadequacy.

With the approach developed, the next step was to translate it into procedures for investigating and reporting human error as a cause of aircraft accidents. This was accomplished and the procedures were officially implemented with their pub-

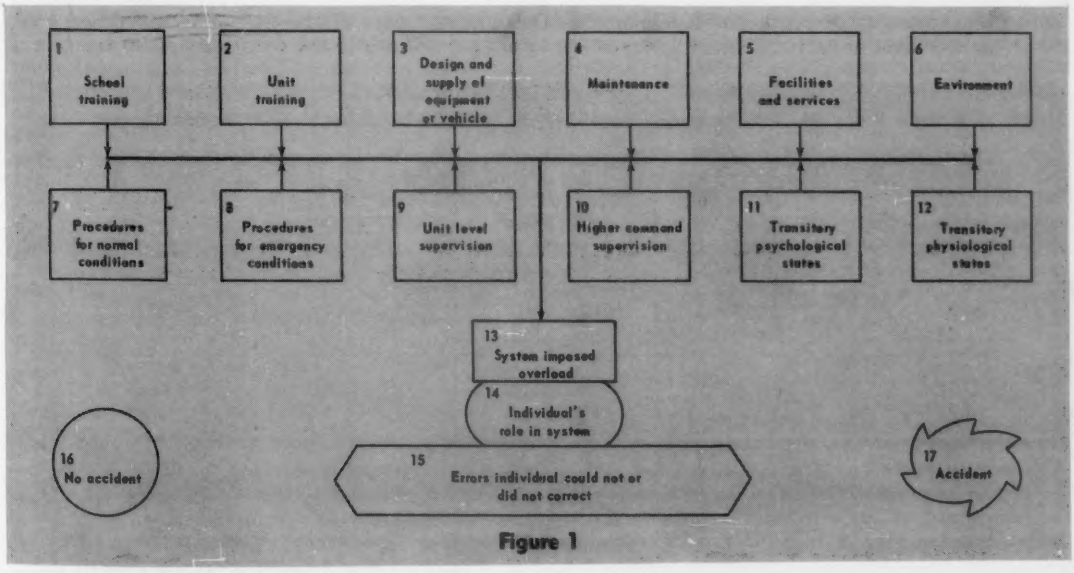


Figure 1

*The words man, he, his and him used herein refer both to male and female.

lication in Army Regulation 95-5, "Aircraft Accident Prevention, Investigation, and Reporting," dated 1 July 1975, with changes 1 and 2.

The 3W approach for investigating and reporting human error is outlined in paragraph 11-2, AR 95-5, and is designed to be used as an approach by Army accident investigation boards to aid them in getting the type of information needed. The problem is that most accident investigation boards are not conducting this investigation. It appears that many investigation boards are using old reports as examples. Many board members may not have even read chapter 11, thinking that it applies only to human factor mishaps. It is clear that revisions to AR 95-5 are needed and as a result USAAAVS is currently working on a new regulation which will be a complete manual on aircraft mishap investigation.

Since the majority of the mishap report findings are not in the format outlined in paragraph 14-4b, AR 95-5, USAAAVS must attempt to construct the 3W findings from the evidence presented in the report. A recent study of 85 mishaps indicated this could be done only 67 percent of the time.

One of the biggest problems USAAAVS encounters when required to conduct the 3W analysis is lack of and inconsistent information on the DA 2397 forms.

Sometimes, many spaces are not filled in on the 2397-1 (the accident report summary). Some of the blocks, such as block 22, are very important when trying to determine the task errors. In addition, those items checked in block 23, whether it be human error (personnel), materiel failure/malfunction, environmental, weather, or other related factors, should be in total agreement and totally explained in the rest of the report. For example, if the 2397-1 shows that there was a definite or suspected personnel cause factor, the 2397-2 (Findings and Recommendations) should contain the individual's duty position, the task he was performing, the error made in performing the task, the document that specifies how the task should be performed, and what caused or allowed the error. If materiel factor is checked on the 2397-1, then the 2397-2 should identify the part (to include NSN) and the type of failure, how that failure affected the individual's or machine's performance and, most importantly, what caused the part to fail.

DA Form 2397-3 has four basic parts – the history of the flight, the background investigation, the crash scene investigation, and the analysis. This may seem rather redundant, but each part is different. The form is set up this way to guide the accident investigation board, as much as possible, through the mishap to ensure that areas which should be investigated are not overlooked. Again, the analysis part of the narrative should be in total agreement with the dash 1 and dash 2. While

TABLE 1. — The 3W Approach to Aviation Accident Analysis and Prevention

ACCIDENT CAUSE FACTORS	WHAT HAPPENED	WHAT CAUSED IT	WHAT TO DO ABOUT IT	ACRONYM
MAN	Task Error	Inadequacies of system	Remedies	TEIR
MACHINE	Failure or malfunction	Inadequacies of system	REmedies	FIRE
ENVIRONMENT	Environment's effect on man/machine performance	Inadequacies of system	REmedies	EIRE

there is bound to be some conflicting evidence gathered by the board, the analysis is the area in which the board should discuss conflicting evidence in drawing hypotheses of what they feel happened in the mishap.

Another problem is with the 2397-4 (Witness Statement). Unfortunately, not enough witness transcripts are contained in the reports. Although the regulation does not specifically require them, USAAAVS finds that the majority of the information for system inadequacies can be obtained from these statements. If the board simply has individuals write out statements and does not actually ask questions, a great deal of needed information is lost. The board should have formal sessions and make thorough witness transcripts of their discussions with the individuals.

The majority of the evidence for the 3W analysis in regard to materiel and maintenance is reported on the 2397-7 and -7A. The board should include as much information as possible on these forms. AR 95-5 states that if a part is suspected to have failed, it should be submitted to Corpus Christi Army Depot (CCAD) to determine why it failed. Most accident investigation boards do not have the expertise to determine why a part failed. Therefore, when a part fails or is suspected to have failed, the board should contact USAAAVS for a control number and send the part to CCAD for a teardown analysis. Occasionally, boards make the mistake of handling the part under the EIR program as outlined in TM 38-750. When this occurs, USAAAVS seldom receives a teardown analysis which is needed to determine why the part failed. There is always the possibility that a maintenance error was committed which contributed to a part failing. When a materiel failure is involved, the board should thoroughly investigate unit maintenance to determine what the maintenance procedures are, and whether it was possible that a maintenance error was committed.

A great deal of improvement is needed in reporting the 2397-9 form concerning psychophysiological and environmental factors as it consists primarily of categorical type factors. First, the board should review the factors to determine if any of them were involved in the mishap. If any of these factors are checked, they should be explained in block 9 of the form; otherwise the categorical information will be practically useless in developing accident prevention remedies. Once this is accomplished, there is some additional information which should be entered in block 9 as outlined in chapter 11, AR 95-5. The majority of the board's information regarding the human error investigation and analysis should be recorded on the -9. Chapter 11 states that, once the analysis is accomplished and recorded, the information in block 9 of 2397-9 can be translated into findings and recommendations appropriate for the 2397-2. In other words, it should all tie together – the dash 1, 2, and 9.

Another form which is occasionally completed incorrectly or not at all is the 2397-17 which contains environmental data. Occasionally, a 2397-17 will have a command factor or training factor checked off, but will not be mentioned anywhere else in the report. Again, all these forms should tie together. If the board feels that an error was committed or that a part failed because of an environmental factor which is checked on the dash 17, then these factors should be explained in the other parts of the 2397 series.

Many boards place the requirement of conducting a human factors investigation totally on the flight surgeon. Although chapter 11 states that the flight surgeon is probably the best qualified individual to conduct the investigation, this may not always be the case, as the majority of the errors made by individuals are caused by system problems not related to the individual. In other words, they are related to an individual's training, supervision, inadequate written procedures for normal and emergency operating conditions, environmental factors, etc. These are areas in which the flight surgeon may or may not be knowledgeable. Even in the area of psychophysiological problems, the flight surgeon may need help. Practically every aviator has experienced these transitory problems at one time or another. Therefore, who better than aviators should be able to recognize such problems as overconfidence, inattention, and lack of or poor judgment in others?

The key to reducing human error mishaps is better investigation and reporting on what causes people to make errors. The standard remedy of informing personnel of the facts and circumstances of past mishaps has been disappointing at best. However, what else can we do until we know more about what causes these errors? The 3W approach to accident investigation will ensure that we find out this most important "W" ... What.

For more information on this subject, contact CW2 Reginald C. Murrell, Directorate for TR&A, USAAAVS, AUTOVON 558-3493/4812, commercial 205-255-3493/4812.

The Indispensable Scout

Brigadier General David K. Doyle
Assistant Commandant U.S. Army Armor School
Ft. Knox, KY

The DIGEST thanks ARMOR magazine for permission to print this article

CIRCLE THE wagons! The Scouts – an element of our force we have assumed as a given; one we have seen as expanding in significance under concepts such as the active defense – are under attack.

The attack comes from both inside and outside the Army and ranges from:

- Those who would eliminate the scouts at battalion level and substitute a smaller consolidated platoon at brigade level devoted primarily to traffic control duties.
- To those who would amalgamate the ground scouts with the infantry because they both ride to war in the same vehicle.
- To those analysts who challenge the necessity for establishing, maintaining or employing any ground or air scouts at any level.

Just as the attacks are varied, so are the bases of the attacks. They range from a simple force reduction exercise to a rationalization that the Threat will be of such magnitude that no one or no element must be specially dedicated to find them – they'll find us.

If you've been in the business of either fighting or figuring out how to fight an armored force, a first reaction to all of this is – bull! What makes the conditions of future battlefields so different or the requirements of the battle commander so different that he will need a lesser capability to see than his predecessors?

In 1974, the Cavalry Scout Ad hoc Committee (CSAC) at the Armor Center completed a study which looked at ground cavalry and formed the basis for standardizing the organization and equipment of the Armored Cavalry Platoon; significantly increased its combat power and the ability of the platoon to perform dismounted reconnaissance by increasing the size of the scout team from three to five. In arriving at its recommendations, which were subsequently approved for implementation, the study reviewed our reconnaissance and security needs and the organizational responses to those needs since World War II, looked to the future and concluded:

- If cavalry organizations were cut out of the Army's force structure, commanders would still be required to dedicate elements of their force to perform reconnaissance, security, and economy-of-force missions – which could cause a one-third reduction in the size of their combat power.
- There is an increasing need for men and units specially and uniquely trained, organized, and equipped to perform reconnaissance and security operations.

By all standards, we thought the mail was answered in 1974 in an objective, rational manner. This was complemented on the air side with the Aviation Requirements for the Combat Structure of the Army (ARCSA III) which was approved in February 1977 and layed out the mix of air cavalry and attack helicopters in our various organizations.

So why the fresh onslaught? Frankly, I don't think it has a thing to do with past study efforts – merely a new set of distractors in the transmit-only position. So we'll go back to the boards to address one more time:

- Do units on future battlefields need to conduct reconnaissance, security, and economy-of-force missions?
- If so, what should be the mix of air and ground cavalry units and do you best perform these missions with specially trained elements or, should we pull tank and infantry units from the main force on an ad hoc basis to accomplish the same thing?

With that as background, let's make sure we're

all on the same frequency as to our needs and what we expect the heart of all cavalry units – the scout – to accomplish.

The Requirements. The commander must be able to 'see' the battlefield .... The first step in winning is seeing the battlefield." These statements from FM 100-5, "Operations," are reinforced in both How-to-Fight manuals, 71-1, and 71-2, the bibles for team and task force tactics, and in statement after statement taken from commanders working the maneuver battlefield in preparation for future requirements. They speak an indisputable truth, a notion certainly not new! If the commander can't "see" the battlefield – before and during the battle – the day, the battle, maybe even the war is lost.

Paramount among the commander's sources of "eyes and ears" today are air and ground cavalry organizations whose principle missions are reconnaissance, security, and employment in an economy-of-force role. In all cavalry units – the corps' armored cavalry regiment or air cavalry combat brigade, the division's armored cavalry squadron with its air cavalry troop, and the maneuver battalion's scout platoon – the SCOUT is the man who does the seeing. He is the number

one source of *real-time*, 24-hours-a-day, any-weather, combat information. And *real-time* accurate information can't be overemphasized because that's what the commander must have so he can make timely, crucial, and correct decisions that spell the difference between the winning and defeat.

The Mission. In each of the cavalry's missions, the men who man the organizations are required to operate over extended frontages and at relatively-extreme distances from the main force. In order to cover the area assigned, cavalry and scout platoons are habitually deployed as squads or even teams. In a screening mission, it is not uncommon for teams of a squad to be separated by considerable distances in order to perform their assigned tasks and report their findings. This situation, which is more the norm than the unusual, establishes a considerable degree of independance in operations. In turn, it necessitates that *all* scouts possess to a high degree the same requisite skills to accomplish the mission.

The SCOUT's mission is "to gather and report information on terrain features, enemy strength, and enemy disposition ..." This mission statement fails, however, to fully describe what a scout does. He performs his duties mounted and dismounted, alone or with one or two other scouts. He must be a skilled observer who knows what he is looking for and how to find it. The scout must be expert at mounted and dismounted map reading and land navigation. He mans observation posts and conducts patrols. He's got to be especially skilled in the intricacies of communication, employing communications-electronics operation instructions (CEOI's) and operating all of the various organic communications equipment. The scout must conduct route reconnaissance, classify bridges, and evaluate potential fording sites. He must be able to calculate demolition charges needed to destroy bridges and other structures, place the charges, and detonate them. Scouts must be able to employ every reconnaissance technique, from stealth to "recon by fire"; and most importantly, he must also understand the relationship between the air scout and himself.

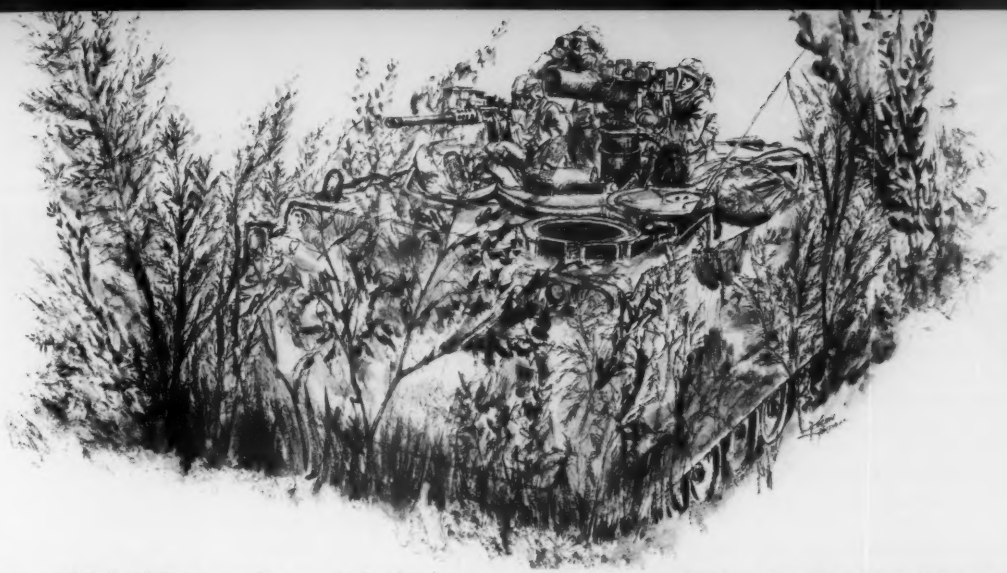
When performing any of his missions, the scout must be able to fight. We made our decision right after World War II that we would go for heavy versus light snoop-and-poop reconnaissance elements not only to enable our reconnaissance forces to fight for information, but also to accomplish critical economy-of-force missions. In past years, the scout was given a .30- or .50-caliber machinegun. Today, the scout has been given a significant boost in capability with the addition of TOW and *Dragon* antiarmor weapons systems; and as we look toward future organization, he will have not only TOW, but also a highly-accurate, long-range, light cannon to accomplish his missions. With the introduction of these weapons, we have also made the scout's life more complex; therefore, we owe it to him to put his weapons into perspective as he seeks to employ them on his varied missions, and most importantly, we must ensure that we train him up to the weapon's capabilities.

The scout also is expected to work with, commit to action or control, a wide variety of assets available not only within his platoon and troop, but also to senior commanders – scout and attack helicopters, indirect artillery and mortar fires, scatterable mines, and tactical air support, to cite a few. The responsibility inherent in these performance requirements is heightened by the fact that the scout's mission is oriented on the battlefield needs of the larger force; corps, division, brigade and battalion. This condition requires that scouts be sufficiently trained and skilled so that commanders from lieutenant colonel to lieutenant general can be confident of the reliability and accuracy of their performance.

Now let's look at the issue of rolling scouts into the infantry, and detailing infantry to perform scouting missions. There is similarity in the tasks that each are expected to perform. At the basic soldier level, there is a 45 percent commonality of tasks taught. Taken to the extreme, a similar comparison of tasks can be made between the scout and the *Hawk*-missile crewman. But this type of comparison distorts the dissimilar emphasis placed in tasks considered essential for the accomplishment of the basic scout mission: reconnaissance, indirect fire, communications,vehicle operation and maintenance, demolition and land navigation. Commonality of tasks decreases and the difference in training emphasis continues as one follows the progression of the scout and infantryman up through the skill levels, which are nothing more than a reflection of the organizations to which they belong, and their missions and methods of operation. Scouts fight to see, while infantrymen see to fight.

Individual Characteristics. The SCOUT we've been describing is not a lieutenant; rather, he ranges from the old trooper, tactically-experienced noncommissioned (NCO) to the young PFC or Specialist Four. No matter what his age or experience, he must be "a man for all seasons."

So what kind of a man do we need for a Scout? First of all, understand that the average new recruit joining the 5th Cavalry Squadron at Fort Knox is between 18-19 years old, has a GT of 100



plus, and joined because he wanted adventure, likes the outdoors, or just plain wanted to respond to a John Wayne call of "Scouts Out."

Now here's what we're looking for: self-reliance, independence, boldness and aggressiveness. He must have physical and mental stamina, exceptional initiative and inquisitiveness. The scout must be totally flexible in reaction to his environment and frequent, unexpected events. He must be trained to perform the high-risk mission as a routine requirement. He must feel at ease operating over extended distances, at a rapid pace, and be willing to, in fact, seek the kind of independent operations that will be expected of him by his unit. Although all of the foregoing are intangibles, they are nevertheless vitally important. And if the recruits don't have these characteristics when we get them, we must foster and build these characteristics in those men qualified to be trained as scouts.

We've talked about the scout, what we demand of him, how he must operate, what training he must have and what it is that makes him different. But here is one more important ingredient in making a scout – the intangible catalyst that binds it all together. That key element is the *elan* and *esprit* of cavalry. Some get squeamish because these cannot be quantified – but the great battle captains have never hesitated to capitalize on or exploit such intangibles. In fact, we would be professionally remiss if we did not nurture in the scout the special skill, loyalty and dedication of the cavalry – because cavalry is a state of mind for all who serve, from the senior leaders to the most junior scouts.

Wrapping up. Whether in the role of the commander who must fight the main battle, or the staffer trying to scope the needs of the battle force, we must ensure that we collectively state our case; but more importantly prove our case through proper training and employment of the scout. Anyone that understands the principle of economy-of-force, our limited – by realistic necessity – resources, and the requirement to concentrate the combat power required to obtain the decision at the time and place must understand the need for a trained, dedicated scout. He doesn't cost us any more. By paycheck, he should, but he doesn't. There is no wasted combat power. In fact, cavalry gives us a lot for our money. In doing what it is supposed to do, it is much, much cheaper and will become more so than tank and mechanized task forces as the new cavalry organization is implemented. At the heart of it all is – the SCOUT.

BG DAVID K. DOYLE enlisted in the Army in 1951, rising to the rank of sergeant before attending Officer Candidate School at Fort Knox. Upon graduation from OCS in 1952, he was commissioned in Armor. Brigadier General Doyle has been a training officer, reconnaissance and tank platoon leader, company executive officer, battalion intelligence officer, company commander, assistant operations officer and assistant G-3 plans officer. After attendance at the Command and General Staff College in 1965, Brigadier General Doyle commanded the 3d Squadron of the 11th Armored Cavalry Regiment in Vietnam. In 1971, he attended the National War College and later commanded the 3d Armored Cavalry Regiment in 1973. Brigadier General Doyle was assigned as the Deputy Commanding General of Fort Knox in 1976 and is presently the Assistant Commandant, USAARMS

EPMS CORNER

Enlisted Personnel Management System

Returning From Overseas Duty

SFC Douglas E. Allen
Aviation Career Advisor
U. S. Army Military Personnel Center

IF YOU ARE assigned overseas and desire service school training enroute to your new assignment your request should be submitted in time to arrive at Military Personnel Center (MILPERCEN) before your return assignment is made.

Soldiers about to return from overseas who have severe family problems should take early action before date eligible for return from overseas (DEROS) to request a compassionate reassignment, rather than waiting until they are due at the new duty station before requesting diversion. Normally it takes 9 months from the time an installation submits a requisition until a Soldier arrives onstation to fill the position. It is unfair to change your assignment at the time you are due to arrive. Another Soldier may have to move on short notice to fill the vacancy or the commander may have to wait another 9 months for a replacement.

If you are on leave enroute to your new assignment, and a situation arises which causes you to need a change of assignment, immediately contact the nearest U. S. Army military personnel office and request assistance. They will be able to advise you about any documentation you will need to request a change of assignment.

Personnel serving overseas who are eligible to submit an application for retirement may request attachment at a particular location other than their scheduled assignment for the purpose of retirement.

Each requisition has a priority of fill designator based on the mission and strength status of the installation or unit submitting it. The priority of a requistion is important and must be taken into consideration. It is possible that an installation where you desired to be assigned has vacancies for your grade and military occupational specialty (MOS) but you may be assigned to another installation needing your grade and MOS because it has a higher priority.

After computer nominations are made, your assignment manager reviews each nomination based on information available in the enlisted master file, which is updated by the Standard Installation/Division Personnel System (SIDPERS). Additionally, for personnel with a career management individual file all information available therein is considered in rejecting or accepting the nominations.

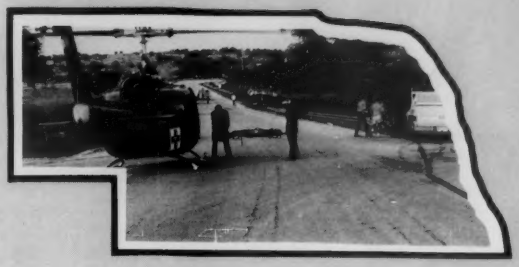
The goal of the assignment manager is to get the right Soldier to the right place at the right time.

The aviation assignment team in Transportation/Aviation/Maintenance Branch, Enlisted Personnel Directorate, is supervised by Mrs. Wilma Chance. The assignment managers are:

Mr. Dale Martin	67W, 67Z
Mrs. Libby Saunders	67V, 68B, 68D, 68F, 68G, 68H
Mr. Donald Todaro	67G, 67U, 67X, 67Y
Mrs. Cheryl Sanker	67N
Mrs. Fran Rawlings	71P, 68J, 68K, 68M
Mrs. Eva Witt	93E, 93H, 93J

As you depart the Continental United States (CONUS) on an overseas assignment you must be curious about where you will be assigned upon your return. If the overseas assignment is to a short tour area – and you are an E5 or above –

Continued on page 30



READY, WILLING AND ABLE: NEBRASKA NATIONAL GUARD

Captain Robert B. Robeson
Flight Line Facility
Lincoln, Nebraska

YES SIR, SPORTS fans there we were, blasting along over the rice paddies at 120 knots, green tracers the size of basketballs hosing-us-down from all sides. I tweaked back on the cyclic, the vertical speed indicator (VSI) zipped past 2,000 feet per minute and the needle buried itself in the peg. Then it happened — engine failure over bad guy country ..."

We've all heard the story before, in varying degrees. The chatter in the dining facility of any aviation unit is much the same, no matter where in the military world you go. Recruits become the constant prey of veterans' tales. The talk is of smoke, fire and tenacious tactical approaches, and no one — not even the veterans themselves — often remember how much of it is truth or exaggeration.

Yet, framed within the war stories, hangar talk and tales of the worst mission ever, they all have the common knowledge that flying is, sometimes, far less glamorous than outsiders believe — and often a lot more dangerous.

Maybe that's what makes the 24th Medical Company (Air Ambulance) and its personnel so unique in Nebraskan history. Their service to the people of Nebraska has been dedicated and long. They've shared the fears, sweat and total dedication before the final pride of accomplishment has been realized.

Nebraska, as many may have already noted, is one of the largest and finest forced landing areas you could ever ask for this side of the Sahara Desert. But there are other things about this great expanse of acreage that the Great Aviator in the Sky could improve. Summer temperatures that soar above 110 degrees; winds which sweep across the open prairie in excess of 50 miles per hour; and winters where temperatures outside the hangar are 60 degrees below zero (wind-chill factors included); would be good places to start. Such weather phenomena make preflighting on the ramp almost as hazardous as not preflighting.

On occasion, National Guard personnel of this Nation have not been given proper recognition for their efforts. (We've all heard the "Boy Scout" and "weekend warrior" labels.) The people of the 24th Medical Company are no different from other Army people stationed throughout the world. Everytime National Guard pilots fly, they face the challenge — and savor the rewards — of meeting the elements with their skill and judgment, just like anyone else. Like most aviators sometime in their careers, they've survived hazardous conditions and often have been shown weather they didn't want to see.

A UH-1 air ambulance is ready to lift off the pad

Trying to find a pilot without Southeast Asian experience, in this unit at Lincoln, is about as likely as picking out someone at a University of Nebraska football game who's not wearing red. Eighty-nine percent of them have returned from the trials of combat with pride in themselves for what they've endured and a more professional respect for the sky above and the hard ground below. They've been out on the "line" where often there's no visible means of support. That's experience money can't buy, no matter at which end of the military spectrum your viewpoint originates.

Another noteworthy and illuminating feature of this organization is that in breaking down total, per pilot, flight hours at the flight facility, the mean point exceeds 1,900 hours. That may not be a record of any kind, but as one person said, "It ain't a bad average." This experience level is what catches your eye from the very start. Some of them seem to have been flying since the USS MAINE sank in Havana Harbor.

Aviation in Nebraska began a long time ago. It was in 1913 that the Nebraska National Guard began development of an aviation section. The officers and personnel of the Signal Corps at Fremont (about 50 miles northeast of Lincoln), "built" a biplane from spare parts they'd scrounged from various sources.

Then, at the end of 1967, planning began for Operation Sky-Aid — another chapter in the pioneering history of Nebraska. Properly called "Nebraska's Air Ambulance and Highway Assistance Project," Operation Sky-Aid was the first such experiment authorized by the U.S. Department of Transportation's Office of Safety Demonstration Projects. At that time, it was the only project of its kind in the United States. It all began with a $7,500 grant.

Sky-Aid was a 14-month study, beginning January 1968, and undertaken jointly by the Nebraska State Patrol, University of Nebraska-College of Medicine, and the 24th Medical Company. The objectives of this demonstration project were:

- To field test under civilian conditions the role a helicopter might play in providing emergency service under the most diversified combination of circumstances possible.
- To provide operating data pertinent to helicopter operations, i.e. weather, night flying, safety, communications and maintenance.

Nebraska's Sky-Aid experience predated the model concept of what was to become AMES (Air Medical Evacuation Systems). AMES, in turn, evolved into the Military Assistance to Safety and Traffic (MAST) project where military medical evacuation helicopters provide assistance to civilian medical emergencies at a moment's notice.

MAST now has been expanded to a national effort from its early beginnings in 1969 and 1970 when five test sites (three Army and two Air Force) were selected to respond to highway accidents. (See "MAST Is," November 1973 DIGEST.)

Those early missions out of Lincoln were flown in two Korean War vintage UH-19C Chickasaw helicopters that the State of Nebraska purchased as surplus for $50 each.

The first mission was flown 6 March 1968 and the crew consisted of two pilots from the 24th Medical Company, a physician and a safety patrol officer.

The objective of the study was not only to learn if the use of air ambulance helicopters was feasible for highway medical emergencies, but also to assist in search and rescue, civil disturbances, fire surveillance and assistance to disaster areas.

The 24th has a number of "firsts" to its credit. In 1968 it won the Eisenhower Trophy emblematic of being the best unit in Nebraska. In 1971 it received "The Outstanding Reserve Component Aviation Unit Award" (1970-1971) from the Army Aviation Association of America (AAAA). This award is given to an aviation unit which has made an outstanding contribution or innovation in the use of Army aviation above its normal mission. One of its major contributions

came during the "national disaster" blizzard and resulting flood early in 1971. Unit helicopters flew 1,256 sorties, including medical evacuation flights and the evacuation of numerous farmers. They carried 431,840 pounds of cargo and flew 392 hours.

Another milestone was reached when one of its crewchiefs became the first female to attend and be graduated from the Army's aviation maintenance training at the U.S. Army Aviation Center, Fort Rucker, AL.

Another facet of the unit's mission entails a neonatal medical evacuation service for infants in need of immediate care. This community cooperation began in early 1970 when a Lincoln pediatrician, with the assistance of the State Aviation Officer, asked Nebraska's Adjutant General to assist St. Elizabeth Hospital in offering this service. He agreed, and the joint operation was born. Since most Nebraska hospitals are not equipped for neonatal intensive care, Lincoln has become the center around which these flights revolve. To date, evacuation crews have maintained a 100 percent success rate in transporting infants to St. Elizabeth's Hospital.

What is the civilian population reaction to these "weekend warriors"? A letter from the parents of one of these neonatal patients tells the story quite well. Their daughter was 2 pounds and 2 ounces at birth. A medical evacuation crew flew her to the hospital in Lincoln. "...Without the services of the Army Guard I'm sure that we would not have Stacy home with us now ... today ... at four and one-half months, she now weighs nine pounds.

Another letter, this time from a physician practicing in a remote area of the state, gives his feelings about the circumstances that required a patient's emergency evacuation. "His condition (dissecting aortic aneurysm) was so unstable that he certainly would not have survived without the help of the National Guard .... It makes me a great deal more comfortable practicing medicine in a rural area such as this when I know that a service of this kind is available for extreme emergencies."

One-third of the 24th's medics are veterans of the Vietnam conflict. They've all received extensive emergency medical training and have treated every imaginable traumatic injury. One even has a Ph.D. degree and is a professor at the University of Nebraska in Lincoln. Another was a Naval corpsman who attended President Lyndon Johnson at Bethesda, MD. For what it's worth, a third medic even has his commercial fixed wing, multiengine, instrument and instructor pilot ratings.

The pilots are a potpourri of motivated individuals. Two of them are working on Ph.Ds. (Nearly 25 percent of the unit's 220 members currently are attending college or vocational school, and that doesn't include many who've already been graduated). There are three dentists, a lawyer and a number of airline pilots and cropdusters "thrown in." One law student commutes more than 500 miles (one way) from Wyoming each drill. Another flies his plane in from Iowa. Even the Nebraska State Aeronautics Director (a governor-appointed position) flies for this unit. Only when you look at this company from such a perspective can you see just how vast and deep the civilian and military talent is.

What about its safety record? Since August 1970 the flight facility has more than 30,000 accident-free hours of flying time to its credit. Coordination, cooperation and communication between the State Aviation Officer and his staff, pilots, crewchiefs and the experience of the fulltime maintenance people at the facility are the reasons for this enviable record. It takes teamwork to accomplish missions and goals. Pride and professionalism aren't extinct in Lincoln.

And the 24th maintains a constant state of readiness, ready for deployment at a moment's notice. The unit recently completed its 1977 active training period at Camp Ripley, MN, and received a C-1 rating (highest possible) from evaluators. The unit consistently scored high

marks in nap-of-the-earth (NOE) and mass casualty evacuation techniques under simulated mid- to high intensity battlefield conditions.

During the remainder of the year the 24th maintains its combat ready posture by training on two newly established NOE courses near Lincoln. The courses were constructed in cooperation with the Nebraska Adjutant General's office.

More than 200 farmers were contacted individually to obtain written permission for the courses to intersect their land. Even though permission was granted, care must be taken when flying over the land because of livestock which are often in the area. One or two upset farmers because of one careless flight could result in the loss of an entire NOE course. This is another of the many variables unique to National Guard aviation units.

Other training programs include mass casualty situations (including NOE type flights) with the 82nd Field Hospital (USAR) in Omaha during the year; and formal classes (including television tapes) on NOE and flying in the mid- to high intensity battlefield situation during the winter months when weather conditions restrict actual NOE work in the Lincoln area.

The unit's equipment is good and its members work hard to keep it that way. In regard to the aircraft situation, many of the pilots still believe of their medical evacuation birds what Shakespeare said about the maturing Cleopatra: "Age cannot wither her, nor custom stale her infinite variety." And, like all aviation people, the personnel of this unit have an unquenchable desire to think well of themselves.

Most of the pilots have recovered completely from "the young god syndrome" — thinking they're immortal. They're dedicated and caring people to whom aircraft still are symbols of human nobility, and to whom the rush of air past a cockpit and the "whumping" of blades is almost the breath of life itself.

If there's a glaring example of deficiency anywhere among the members of the 24th, it is probably in the fact that their aircraft commanders (like all aircraft commanders) don't "sweat." When you've survived chunks of iron playing around your ears, been bounced around the sky in a blizzard like a volleyball with an air leak, and confronted tornadoes and other "rushing, mighty winds" — intent on making aerial shish kebab out of you if you don't keep ahead of the aircraft, or the weather — there's not much left to get excited about. They've experienced most of the genuine, certifiable "hairies" many pilots are unfortunate enough to have known.

Yet, there's another side to these people. Their interest and involvement in the community (since it really IS their community) runs deep. A number of programs have been developed by the flight facility to enhance the abilities and understanding of area young people in the field of aviation .The inquisitive nature of kids and their fascination with anything that flies (remember?) can be seen through letters sent to the flight facility from elementary school children who have just observed a helicopter demonstration at close range for the first time.

Here's one from an observant little boy: "Thank you very much for everything .... The best thing I liked was climbing in the big helicopter. I was surprised to see how clean it was." And then from a little girl's viewpoint: "... it was fun seeing you fly .... It was so nice of you to spend all that time on us when you could have been working." Oh well, you can't win 'em all.

Unit crewmembers have to schedule their lives around meeting flight minimums, instrument checkouts and NOE course work just like everybody else. Their mission is the same as any active duty medical unit — to save lives and alleviate human suffering. They use their flying talent for those they live, play and work with — affirming life, inspiring, helping and encouraging. They fly precisely, proficiently and professionally. Is it necessary to pick the rose apart to see what makes it grow? Not really. The results are all that really matter in the final analysis.

The 24th's medics are able to handle any medical evacuation situation due to their extensive experience and training

As everyone knows, work which doesn't reflect a deep inner wish is mere drudgery, as inescapable and unpleasant as taxes. On the other hand, work which you can put your heart into, which provides expression for your real talents and abilties, is both satisfying and rewarding. For the men and women of the 24th Medical Company, flying and medical evacuation provide this expression. From the very beginning, they've always had a sleeves-rolled-up approach to their mission.

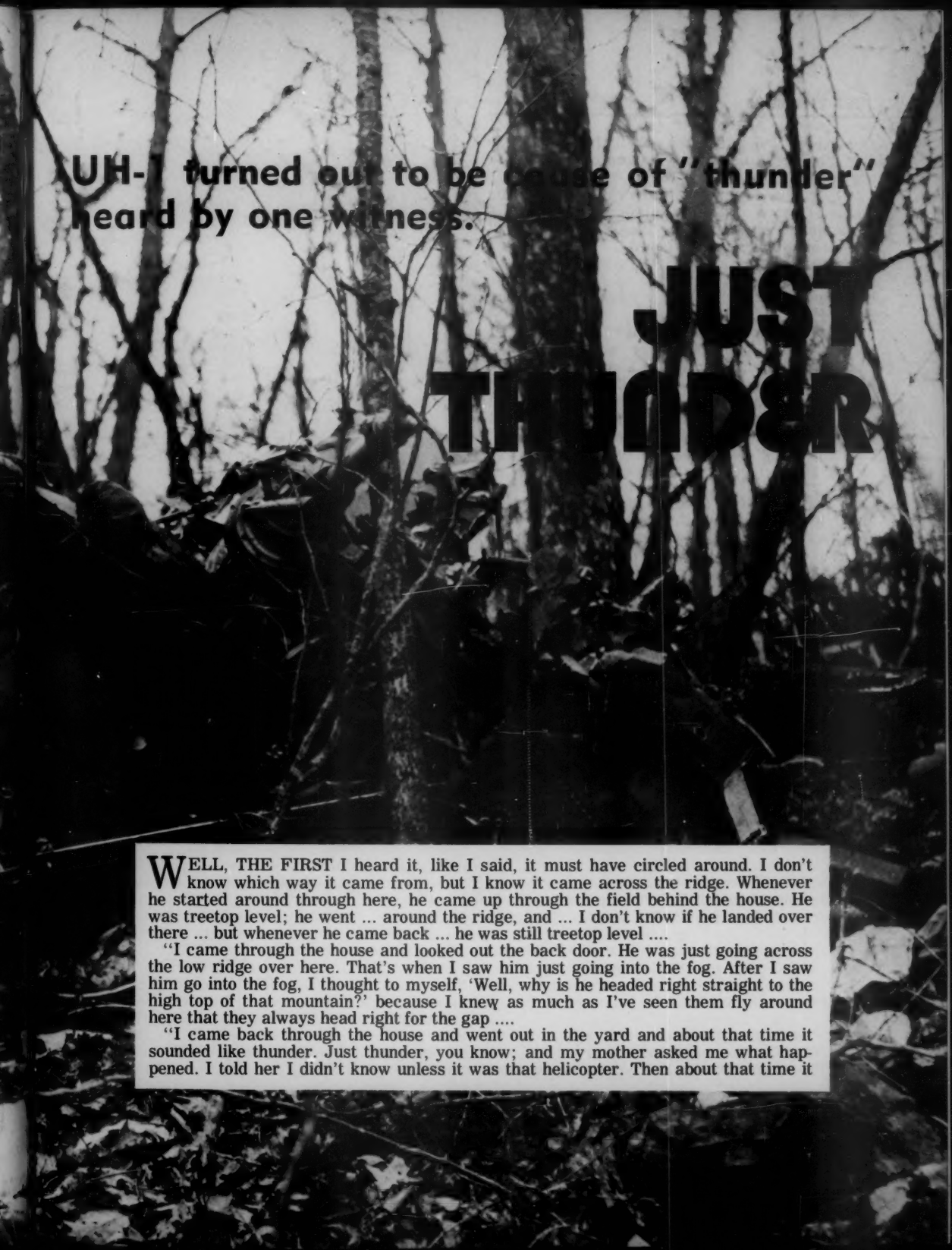
One other insight into their devotion is the fact that about 20 individuals from the flight facility have been decorated for their efforts in lifesaving missions, in connection with floods, blizzards, tornadoes, neonatal and other traumatic injury evacuations.

The day-to-day professional performance of this unit, through the years, proves that the National Guard can be counted upon to assume the increased role dictated by very real reductions in the active Army. It's taken a lot of effort by every officer, noncommissioned officer and enlisted person in the unit, but with dedication and teamwork, they are prepared to accomplish any mission assigned. This is what the "One Army Team" concept is all about.

F. Lee Bailey, in "The Defense Never Rests," expressed his feelings about responsibility and what he would do to make young people into men and women. "I would teach them all to fly. I would send them up when the weather was rough, when the planes were in tough shape, when the birds were walking. The ones who survived would understand the meaning of 'alone'."

The personnel of Nebraska's Air Ambulance Company, and the flight facility in Lincoln, know all about that. They've been "there" before, and they are "ready, willing and able" for any eventualities in the future — whatever they may be.

Since most Nebraska hospitals are not equipped for neonatal intensive care, the unit is willing to cooperate with local hospitals in vital medevac similar to that shown



WELL, THE FIRST I heard it, like I said, it must have circled around. I don't know which way it came from, but I know it came across the ridge. Whenever he started around through here, he came up through the field behind the house. He was treetop level; he went ... around the ridge, and ... I don't know if he landed over there ... but whenever he came back ... he was still treetop level ....

"I came through the house and looked out the back door. He was just going across the low ridge over here. That's when I saw him just going into the fog. After I saw him go into the fog, I thought to myself, 'Well, why is he headed right straight to the high top of that mountain?' because I knew as much as I've seen them fly around here that they always head right for the gap ....

"I came back through the house and went out in the yard and about that time it sounded like thunder. Just thunder, you know; and my mother asked me what happened. I told her I didn't know unless it was that helicopter. Then about that time it

thundered, and I told her, 'Well, I guess it was just thunder.' I didn't know anymore about it until they came out here ...."

"It" refers to a UH-1 that crashed with nine persons aboard while on a mission in support of a mountain base camp; and "they" to members of the accident investigation board.

Briefly, the mission was to transport aggressor troops to three landing zones, then return to the base camp for an airmobile exercise involving students.

Before the first flight, weather conditions and visibility were good. However, on reaching the first landing zone where two passengers disembarked, the weather began to deteriorate rapidly. The mountain peaks to the north became covered with clouds and light rain was falling. The pilot delayed flight for several minutes, then took off, climbing along the contours of the mountain. Witnesses at the landing zone observed the aircraft for about a thousand meters until it disappeared behind trees. At this time, rainfall became heavy and fog began to roll in. The aircraft never arrived at the second landing zone. The last person to observe the aircraft in flight was the witness who watched it disappear into the fog.

After the aircraft departed the first landing zone the pilot failed to establish flight following and no contact was made with any of the occupants until the following morning when one survivor, soaked from the rain and suffering from various injuries and shock, limped down the mountain to a house where he summoned help. When local and military personnel reached the crash site, they found one additional survivor. The seven remaining occupants had sustained fatal injuries.

While the direct cause of the accident – striking trees – is obvious, the conditions which "set up" the accident are not as readily apparent. These include practices of omission as well as commission which, over a period of time, prepared the stage for the accident.

To begin with, the type of support mission in which the ill-fated aircraft was participating was a recurrent one, with aircraft drawn from various sections of the company. In this instance, a flight of six aircraft, without an air mission commander (AMC), was sent to support the base camp. At no time through the entire mission, including the actual search and recovery of survivors and victims, was there a representative of the unit chain of command present. This lack of command supervision was a factor in the accident.

The presence of an involved leader would have ensured that, according to current policies, procedures and regulations, a flight plan with passenger manifest was filed with base operations and that an aviation-oriented weather briefing

was obtained. Further, a command decision would have been required as to whether or not the mission was to continue. As it was, no valid weather forecast was requested for the local area, no local DD Form 175 was filed, and no passenger manifest prepared. In addition, the decision to continue the mission rested solely in the hands of the pilot-in-command. The lack of command supervision by the aviation element was caused by a requirement for the unit to prepare for a forthcoming Army Training Evaluation Program.

Numerous questions arise. Why, for example, did the pilot-in-command continue flight after dropping off two personnel at the first LZ? Why was no flight following contact made? Why did the pilot fly into marginal weather conditions? Why did he continue to operate under these conditions rather than execute inadvertent IFR procedures? Were there any other factors that contributed to this accident or to the injuries sustained by the occupants?

Information obtained during investigation provided considerable insight into these questions.

There was no pressure from the rangers to fly missions. Approximately one-third of the pilots

"This mission was considered by many of the participating pilots to be a welcome relief from the rigors and regimentation ..."

did not file DD 175 flight plans while flying in the local area, and rarely called for an actual weather briefing. There was a general lack of confidence in weather briefings as pilots did not feel they were accurate. Pilots relied on aircraft weather checks as the best way to get accurate weather information.

The pilot involved in the mishap was considered to be a good pilot as far as flying skills were concerned. Further, he was an excellent instrument pilot who would not be reluctant to fly IFR. However, there were some misgivings as to his judgment when flying unsupervised. It was known that the pilot-in-command had a tendency to fly low and possibly take more chances than necessary to accomplish a mission. His supervisors had heard complaints concerning his flying in the past, but knew of nothing that would indicate he wasn't a capable and professional aviator. Nevertheless, several members of his own unit regarded him as being confident in his abilities, possibly overconfident to the point of going beyond his capabilities – his attitude being one of "can do," with no task too great for him to handle.

The only briefing prior to a mission came from a "mission book" that the pilots read in operations. This book contained aircraft and pilots assigned for the mission, frequencies and call signs, and takeoff and reporting times. None of the pilots who had served as an AMC had been briefed on the duties of an AMC. No one could recall the hazards of mountain flying being covered in a safety meeting. Mountain weather had also been neglected during normal weather briefings and there was no unit SOP covering inadvertent IFR. There was considerable confusion as to what field elevation was used at the base camp. Estimations varied from 1,600 feet to 1,750 feet (actual elevation, 1,748 feet). Pilots flight followed with the base operations and used to call when taking off from each LZ, but were now calling only on takeoffs and landings at the base camp. Additional factors revealed during investigation were:

(Command) Mountain Operations

- The unit had no formal pilot mountain flying qualification program. New pilots were oriented primarily on the specific terrain they would be working in.
- No briefing was conducted to familiarize pilots with the various situations unique to mountain operations, such as unusual weather phenomena.

Maintenance

- The flag on the pilot's attitude indicator would not go down and had been shown on DA Form 2408-13 as having been wired incorrectly. (This *may* have spurred some reluctance on the part of the pilots to enter IMC.)
- The transponder circuit breaker would continually disengage, but the cause for this was never pursued.
- The DA Form 2408-13 indicated the AIM altimeter had been removed, while the maintenance officer stated there had never been an AIM altimeter installed on this aircraft.
- The historical file of DA Forms 2408-13 and 2408-14 was *not* being properly monitored and correlated. Several write-ups were dropped without any corrective action having been taken.

Protective and Survival Equipment

- Five passengers were seated on the floor wearing lapbelts attached, two per cargo ring at some points (some of which pulled out from the floor).
- The crew chief was wearing a "monkey strap", as far as can be determined, without a lapbelt.
- Helmets were not retained by crewmembers during the crash sequence.
- No survival equipment was carried by the crew.

Here are some corrective actions:

- A member of the formal chain of command provide the leadership for the mission, and that this leader be thoroughly briefed on his duties by his next higher leader.
- A clearance authority be designated by the air mission commander to ensure that weather has been obtained and is adequate for the flight planned.
- Unit brief all crews periodically as to VFR flight requirements in mountains.

• Pilots file a flight plan and obtain weather in accordance with Supplement 1 to AR 95-1.

• The flight plan include adequate checkpoints to provide positive flight following of all aircraft.

• Procedures be followed to ensure that aircraft restricted from flight into IMC are not scheduled for missions in marginal weather conditions (or worse).

• Procedures be followed to ensure faults are accurately recorded and properly corrected in accordance with TM 38-750.

"though the accident happened at the time the aircraft hit the trees, it began much earlier ... when the decision was made to send the flight up to the base camp with no recognizable leadership ..."

• All crews carry survival equipment suitable to type of terrain and weather for the planned flight.

• A formal program be established to orient and qualify each pilot in the unit in mountain operations prior to being released as a pilot-in-command.

• Mountain operations and mountain weather be a topic of discussion at safety meetings at least once a quarter and that contents of the most current meeting be required reading for all new pilots.

• Special aspects of mountain flying such as unusual weather phenomena, safety hazards, or any other conditions that may affect the day's mission be briefed *daily* to all pilots participating in these missions.

• Passenger seats be installed in aircraft when passengers are to be transported.

• Only one lapbelt be attached to each cargo ring due to tensile strength of rings.

• Each aviator and crewmember have his helmet fitted annually by the flight surgeon during his annual flight physical or upon receipt of a new helmet before being released for flying duty.

• The "monkey harness" be removed except for situations in which the crew chief is required to be free in the passenger compartment.

Perhaps the best summation of this accident can be expressed in the words of one of the investigators: "Though the accident happened at the time the aircraft hit the trees, it began much earlier at some undetermined time. For this particular mission, it began when the decision was made to send the flight up to the base camp with no recognizable leadership.

"This mission was considered by many of the participating pilots to be a welcomed relief from the rigors and regimentation ... As a result, without any recognizable unit leadership, the crews took full advantage of the leisure pace. Operating as individual crews in the leadership void, the crews rapidly deteriorated as a unit. The flights were assigned by consensus or volunteered. In this environment, the pilot surfaced as the area expert ... The casualness of the entire operation led to departure from the base camp without filing a flight plan, a passenger manifest, and as best as can be determined, without a current weather forecast. Other pilots stated they would not have gone on the mission because of the weather.

"The lack of any weather briefing by a competent forecaster or observer was common due to the lack of good data for the base camp area and the pilot's mistrust of what is given. This may or may not be well founded. It is a fact that the weather for that area is difficult to forecast, but on this particular day, the forecast was accurate. As a miminum he would have been advised that it would be deteriorating with rain, thunderstorms and fog .... As the pilot departed the base camp, he had little working for him ....

"Search and rescue operations were hampered by failure to file a plan of flight and establish radio contact, compounded by the lack of survival and signal equipment as required by unit SOP.

"This accident was the result of an accumulation of factors, the primary cause being pilot overconfidence and disregard for sound aviation procedures. Contributing to these primary factors was the lack of unit leadership and involvement ...."

PMS CORNER

Returning from Overseas Duty

Continued from page 18

you already know about your return assignment through the homebase advanced assignment program.

Upon completion of a long tour assignment you will be slotted against a valid requisition much the same as when you were selected for your overseas assignment.

Approximately 4 months before your DEROS you initially will be considered by the Cap III Assignment system which incorporates a computer system to assist in selecting the right Soldier for an assignment.

The requisitions submitted to your assignment manager list requirements that should be met by Soldiers selected to fill the requisitions. These requirements include MOS, pay grade, special skill identifiers, additional skill identifiers, security clearance, etc. As you are being considered for nomination to an assignment the computer also considers your CONUS area of preference. The ideal situation occurs when you meet the requirements for a requisition and are nominated for assignment to your area of preference.

You may be able to influence your future assignments simply by keeping your areas of preference updated on your DA Form 2 and your Enlisted Preference Statement, DA Form 2635.

Soldiers planning to separate from military service soon after their return from overseas – and who do not desire assignment to a CONUS installation away from the area in which they plan to live after separation – should consider requesting an extension of their foreign service tour in order to return to CONUS upon expiration term of service (ETS). There are no provisions to assign Soldiers at specific locations just because they say they will not reenlist.

Air Traffic and Airspace Officers Educational Seminar

On 4-5 October 1977, an Air Traffic and Airspace (AT&A) Officers Educational Seminar was held in Chicago, IL, for AT&A officers from the four central and six Great Lakes states. Seminar attendees included a cross sectional representation of active Army, Reserve and Army National Guard units. The purpose of the seminar was to provide AT&A officers and other attendees with information concerning the National Airspace System (NAS) which has become a critical national resource.

Federal Aviation Administration (FAA), Department of the Army, and U. S. Air Force representatives were on hand to provide information on special use airspace and FAA functions.

Opening statements by COL Bernard V. Elliott, Director, U. S. Army Air Traffic Control Activity-Aeronautical Services Office, and Mr. John M. Cyrocki, Director of the FAA Great Lakes Region, brought to the forefront that airspace has become a national asset and it must be managed and used to the utmost to satisfy the needs of both the military and civil community.

The exchange of information between active Army, Army Reserve and Army National Guard participants resulted in a successful seminar and will enhance the one Army concept. Future seminars will be expanded to include additional detailed subjects concerning airspace matters and procedures.

OPMS CORNER

Officer Personnel Management System

ACIP And Aviation Personnel Update

Major Thomas M. Walker
Aviation Management Branch
U. S. Army Military Personnel Center

MONTHLY ACIP Status. Information received from the field indicates that some confusion exists regarding the annual flying requirements for officer aviators above the grade of lieutenant colonel who are on monthly Aviation Career Incentive Pay (ACIP) status, as opposed to continuous ACIP status. The question seems to be what regulation governs the flying minimums for aviators on monthly ACIP status – AR 95-1, "Army Aviation: General Provisions and Flight Regulations," or the Department of Defense (DOD) Pay Manual?

In an attempt to answer this question, several points must be addressed. First, the distinction between continuous ACIP and monthly ACIP status must be defined. Second, application and purpose of flying minimums in AR 95-1 and the DOD Pay Manual need clarification.

To be eligible for continuous ACIP an aviator must: (1) have less than 12 years aviation service, and (2) pass the 12- or 18-year ACIA "gates." Aviators who fail to meet these requirements remain qualfied for aviation service as outlined in AR 95-1; AR 95-63, "Aviation Standardization and Instrument Program"; and AR 600-106, "Aeronautical Designations and Flying Status for Army Personnel." By so doing, they are entitled to monthly incentive pay when assigned to an operational flying position.

Of course, all ACIP eligibility – continuous or otherwise – ceases once a commissioned officer aviator reaches 25 or more years of Total Federal Officer Service (TFOS). The 25-year TFOS restriction is not applicable to warrant officer aviators. Appropriate orders requiring the performance of operational flying duties for aviators on monthly ACIP status are issued by the installation commander in accordance with AR 37-104-3.

AR 95-1 exempts commissioned officer aviators (Colonel and above) from meeting the annual combat readiness flying (CRF) requirements contained in Tables 2-1/2-1a and 2-2/2-2a. This provision permits these aviators to participate in aerial flights only when operational requirements dictate. An aviator in this category on continuous ACIP status receives incentive pay irrespective of hours flown during the annual period.

On the other hand, an aviator on monthly ACIP status – regardless of grade and assignment – must meet the minimum flying requirements of the DOD Pay Manual to be eligible for incentive pay. The flying hour program for aviators receiving monthly ACIP and provisions for accruing hours toward the minimum requirements are detailed in the pay manual. While AR 95-1 defines operational flying hour requirements for aviators, the pay manual dictates requirements for entitlement to both continuous and monthly incentive pay. Accordingly, monthly ACIP entitlements for aviators, to include colonel and above, are governed by the pay manual and not the minimums in AR- 95-1. Consequently, the four hours per month minimum requirement overrides operational minimums addressed in AR 95-1.

Women in Army Aviation. Military Personnel Center (MILPERCEN) continually receives inquiries from commanders in the field concerning the utilization/assignment policy for women aviators. Specifically, they want to know what aircraft or unit restrictions exist and by what authority. The only restriction regarding utilization of women in Army aviation is unit of assignment – there is no restriction by type or category of aircraft. Current Department of the Army policy prohibits women aviators from being assigned to units where the primary mission is to close with and destroy the enemy, e.g., a 15B position in a combat assault helicopter or attack helicopter company. Although women aviators may attend all categories of Army advanced aircraft qualification training, their attendance – as with all aviators – is a function of Army requirements. Additional guidance relating to assignment policy of women aviators is contained in the following Army regulations:

- AR 310-49, "The Army Authorization Documents System (TAADS)," 10 Jun 75.
- AR 570-4, "Manpower Management," 11 Nov 75.
- AR 611-101, "Commissioned Officer Specialty Classification System," 15 Nov 75.
- AR 611-112, "Warrant Officer Military Occupational Specialties," 3 Jun 61.

MSAW At Rucker

PFC Mike Ball
Public Affairs Office
U. S. Army Aviation Center
Fort Rucker, AL

ONE OF THE MOST sophisticated aircraft navigational aids available, the computer/radar linked Minimum Safe Altitude Warning (MSAW) System, has been put into operation at the U.S. Army Aviation Center's Cairns Army Airfield, Ft. Rucker, AL.

The MSAW system is a subsystem used in conjunction with the Automated Radar Terminal System (ARTS) at Cairns Army Radar Approach (ARAC). The system is designed to aid air traffic controllers in detecting aircraft which are in hazardous proximity to terrain or obstructions. There are 64 such systems in the United States. But the Cairns system is the only one within the Department of Defense, according to Mr. Jerry Byrd, civilian data systems officer at Cairns ARAC. "It's an excellent system," he said.

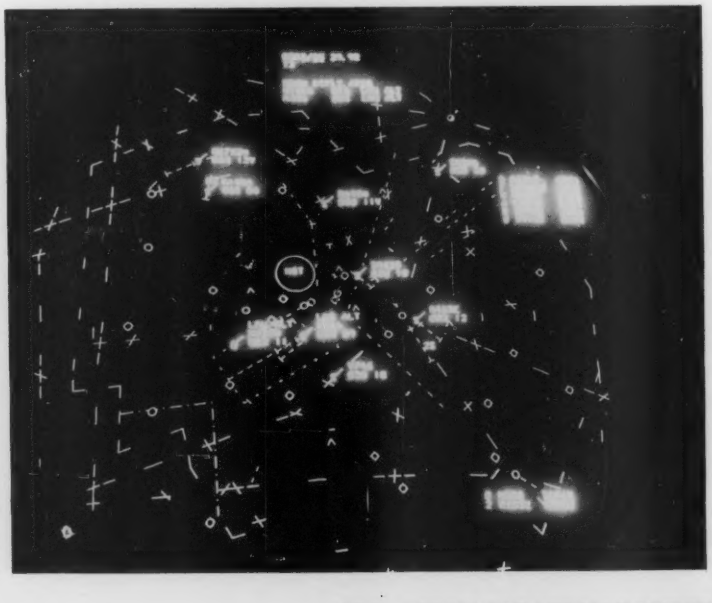
About 90 percent of all aircraft flown within the 55 radial mile operating range of the MSAW system are equipped with Mode C transponders, devices which transmit signals enabling them to be recognized and shown on a radarscope. Each aircraft transmits an individual transponder code.

A computer system linked to the radar receives the signals and instantaneously compares the aircraft's location, as interpreted and displayed on the radarscope, with a chart showing all natural and other obstructions within the radar coverage area. The system at Cairns operates to an altitude of 6,000 feet and covers about 8,000 square ground miles.

The chart, incorporated in the computer's memory banks, displays the total area within the MSAW system's operating range. The area is gridded out into 2-mile squares with an altitude assignment equivalent to the highest terrain/obstruction within each individual square. These assigned altitudes are used in the "general terrain" portion of the program. Final approach monitoring also is provided.

The development of the reference chart in the computer's memory banks required extensive, complex work on the part of Mr. Byrd, and Mr. Richard Shepard and Mr. Joe Frazier,

MSAW scope indicates when aircraft fly too close to obstructions
(photo by SP4 Al Godwin)



other civilian members of the Army Radar Approach Control Data System staff at Cairns. More than 300 topographical charts, furnished by the U. S. Geological Survey, had to be examined and interpreted. The highest point within each 2-mile section, about 4,000 of them, had to be recorded.

Once the system has determined that an aircraft is in hazardous proximity to terrain or an obstruction, the computer activates a 5-second aural alarm in the radar control room to alert the air traffic controller to the situation. Simultaneously, a visual warning, "LOW ALT," appears on the radarscope just above the aircraft's identification block. The visual alert continues until the altitude has been corrected or the danger otherwise has been averted.

Once an aircraft has initiated its final approach, usually from about 6 to 10 miles from the landing site, the Approach Path Monitor System takes over. Flights made under visual flight rules (VFR) are excluded from MSAW system monitoring unless specifically requested by the pilot.

The MSAW system at Cairns Army Airfield is programed to monitor 15 different approaches at 7 aircraft landing sites within the 55 radial mile area. Those sites include: Cairns, Hanchey, and Lowe fields at Ft. Rucker; Blackwell Field at Ozark, AL.; the Dothan (AL) Municipal Airport; the Troy (AL) Municipal Airport; and the Marianna (FL) Municipal Airport.

Dan Hinderlite, air traffic control specialist at Cairns AAF, scans the MSAW scope (photo by SP4 Al Godwin)

"It isn't a fail-safe system," said Byrd. "but it is another tool the air traffic controller can use to make flying safe for pilots."

There are more than 400 radar approach controls in the United States affiliated with the Federal Aviation Administration. Based on the total air traffic handled per day, Cairns Army Radar Approach Control ranks among the top 15 percent of that group.

Navy — How To Get The DIGEST — Navy

SECNAV INSTRUCTION 5605.1B and its enclosure (1) provide information for Navy activities concerning exchange and requisition of Army publications. Marine Corps activities should submit requirements in accordance with MCO P5600.31C.

Navy field activities may exchange reasonable quantities of unclassified publications locally with Army activities and such local transfer is encouraged. When the desired publication is not available locally, guidelines in enclosure (1) should be used for requisition.

I. General 1. The request must reflect the complete mailing address of the consignee. 2. The requisition must reflect the ordering number/form or publication number, if known, as it appears in the publications index of the source service. The title of the publication/form need not be given unless it is the only means of identifying the material. 3. If the publication is classified (or if the form is accountable) the requisition must be accompanied by a letter of justification, which will also certify the need-to-know, security clearance and classified storage capability of the intended consignee. 4. Request documents must be clearly annoted "NAVY REQUIREMENTS." 5. Requests submitted will be cancelled if the item cannot be supplied and activities originating the requisitions will be notified of the cancellation.

IV. Continuing/Follow-on Requirements. Submit a letter with detailed justification of the requirement via the appropriate chain of command to the Director, Navy Publications and Printing Service Management Office, Code SC, Bldg 157-3, Washington Navy Yard, Washington, DC, 20374.

How well do you understand your aircraft and the related emergency procedures ...

What do you do? Why do you do it?

Captain Charles K. Griffin and **CW4 John C. Moodt**
Directorate for Plans, Operations and Education
USAAAVS United States Army Agency for Aviation Safety

HOW WELL DO YOU understand your aircraft and the appropriate in-flight emergency procedures? Accident data shows that many aviators initiate what they feel to be the correct procedure without fully understanding the impact of their actions on the given situation. Without a full knowledge of the "whys" of an emergency procedure, coupled with failure to consider external (environmental) factors, you could set yourself up for a compounded emergency which you may not be able to handle.

But, you say, you're a highly proficient aviator and fully aware of your procedures. After all, you passed your last stan ride, right? Well, let's try a few questions. See how your answers compare.

Q. What should you be cautious of when pulling the hydraulic circuit breaker for a hydraulic failure in a UH-1H?

A. After hydraulic failure, you should first adjust your airspeed to obtain the most comfortable control movement level. Next, pull the hydraulic circuit breaker to determine if there has been an electrical failure of the hydraulic control switch. If there is a switch failure, the hydraulics will come back on when the circuit breaker is pulled. It is essential that the individual on the controls be relaxed at that moment to avoid overcontrol if the hydraulics come back on.

Maybe you already knew that. Let's continue with the situation.

Q. Assume that hydraulics were not restored and you have turned the hydraulic control switch off and reset the master caution light. Are you going to return to the airfield, which is 25 miles away?

A. The operators manual states that you should land at the nearest available safe landing area. How would you define "safe landing area"? Basically, it is an area to which you can make a shallow approach and a running landing without digging in. But, you say, I can fly quite comfortably with hydraulics off. Why not go back to the airfield where there's a paved strip, and maintenance? Let's consider why that particular instruction is in the operators manual. To start with, you don't know what caused the hydraulic failure. Could it lead to something more serious? The answer to that is a definite "yes!" If your hydraulics failed due to a loss of fluid, the hydraulics pump is running without any lubrication and could overheat enough to cause a fire in the transmission area. Even though there is a new nonflammable hydraulics fluid being incorporated into the system, a mixture of only 3 percent of the old fluid can negate the nonflammability. In addition, there is a remote possibility of the overheating situation to cause binding in the transmission. A shaft in the pump is designed to shear if this situation occurs. But what if it doesn't? After all, the entire hydraulics system was designed not to fail. But it does!

Let's look at another area. If you have a hydraulics failure, according to the operators manual you should turn off the hydraulics switch. Why? To prevent the hydraulics from inadvertently coming back on when you don't expect it. If the switch is off and you then have an electrical failure, the function of the switch is negated and you could have an intermittent or uncontrollable recurrence of hydraulics. Imagine yourself on a short final in a hydraulics-off approach. As you are trying to "gorilla" the collective down, the hydraulic system reactivates. Can you lose control?

There are good reasons for getting that aircraft on the ground as soon as you can. Don't risk an uncontrollable situation by trying to take it home.

Now that we've addressed hydraulics pretty well, let's look at another "simple" emergency. How about a high-side governor failure in a UH-1 or AH-1? Load up the rotor to maintain rpm below the red line and then obtain manual control of rpm with the throttle. When conditions permit, enter autorotation, retard the throttle, go to emergency governor, obtain operating rpm again with the throttle, and land as soon as possible. That's pretty straightforward – or is it?

Q.What has happened to the engine that causes a high-side governor failure (overspeeding N2 governor)?

A. Essentially, what has happened is a mechanical malfunction. The effect of this malfunction is that the main metering valve in the fuel control unit goes to the full open position, allowing unrestricted fuel flow. By retarding the throttle, we are using a manual metering valve to restrict the fuel flow.

The operators manual states that when conditions permit, you should enter autorotation, retard the throttle, go to emergency governor, and open the throttle to operating rpm by manual control. Since you can manually control rpm in the AUTO position, why go through all that to get into the emergency governor mode? In the AUTO position, fuel flow is maintained through a line that contains a faulty valve. If this valve were to fail even further, it could move to the fully closed position, thereby cutting off your fuel flow entirely. In the EMER governor position, fuel is rerouted around the main metering valve, thereby preventing an uncontrollable fuel shutoff situation. Even further, the changeover solenoid that is actuated by moving the governor from AUTO to EMER is electri-

Continued on page 42

Molting Season:

Cobra / TOW fangs are bared as it fires a TOW missile. Note the gunner, seated in front, leaning over the TSU (telescopic sight unit)

The Cobra Gets New Fangs

Mr. Joe Ruggerio
The Adjutant General Center
Washington, DC

WEBSTER DEFINES the verb "molt" as meaning "to shed hair, feathers, shell horns or an outer layer periodically." Snakes are among the species that engage in this phenomenon, and in a sense that is happening now to certain Cobras — not to Mother Nature's deadly vipers but to the Army's equally deadly AH-1 Cobra attack helicopter.

In Amarillo, TX, the AH-1G Cobra is acquiring new fangs, namely the tube-launched, optically-tracked, wire-guided (TOW) missile developed by Hughes Aircraft Corporation. These new fangs give the Cobra increased killing power against tanks and other hard point targets. In recognition of its new prowess, the aircraft being modified have been redesignated the AH-1S, Cobra/TOW.

This "molting" process is part of the Cobra/TOW Modernization program managed by the Cobra Project Manager's Office at TSARCOM (Troop Support and Aviation Materiel Readiness Command), St. Louis, MO. TSARCOM has life cycle management responsibility for all Army aircraft and aviation equipment.

Over a period of years hundreds of the "G" Cobra models will undergo this transformation. Priority for distribution of the modified models has been given our forces in Germany, which already have taken delivery on many of the Cobra/TOWs. Operation readiness (OR) reports and comments from field commanders indicate the new fanged models are performing exceedingly well.

The turnaround procedure at Bell Helicopter Textron's Amarillo facility begins when the Cobras arrive, either flown in by ferry crews or airlifted from overseas by C-141 cargo planes. They receive a preinduction inventory, flight test and are defueled if necessary. Windows and all exterior openings are masked for protection.

Once in the hangar the main rotor assembly and weapons are removed and preliminary inspections performed. All components removed for later reinstallation are inspected and routed to upgrade and repair satellite shops.

The ships then are moved to the ramp staging area where they are prepared for the pro-

duction line. Disassembly in preparation for maintenance and repair (MAR) and modernization (MOD) begins. This involves the removal of the engine, transmission, cowling, access panels, drive train and tailboom.

The cabin structure is stripped of all fire walls and electrical and mechanical components before cleaning. Skid gear, cabins and tailbooms are degreased thoroughly on the washrack. The aircraft is now ready for its major operation.

After first being cycled through MAR, the cabin enters the MOD production line, where the transmission pylon is reworked to accommodate the improved dynamics.

A "nose job" is performed, wherein the "G" model nose and surrounding supports and brackets are removed completely in preparation for the TOW missile system modification. Supports and frames for the new nose are then put in place and an alignment tool attached to locate accurately the forward wall.

An additional structure is installed to support the TOW telescopic sight unit (TSU), and a new skin is fitted to the nose. Wiring modification is installed and tested before the cabin moves down the production line.

While all this is going on, major MOD rework is being done on the tailboom for dynamic component and in the forward section primarily for weapons.

The aircraft fuselage enters the line first while the tailboom and cabins wait their turn after their wiring procedures are completed.

Fire walls, hydraulic lines and mechanical linkages are installed first on the fuselage, and an improved transmission mount is added to support the new power train. An uprated engine and modified transmission then are installed.

The new Cobra/TOW is almost complete with the installation of the 42 degree and 90 degree tailrotor gear boxes, driveshaft, horizontal stabilizer and tailboom. Simultaneously, the Sperry Univac M28 helmet directed fire control system is assembled into the cockpit.

Final aircraft assembly is accomplished when the basic mechanical, electrical and hydraulic installations are completed.

While the entire ship's electrical and hydraulic systems are being checked, the TOW system is bench-tested by its contractor. Next, the TSU is installed, all guns and launchers are boresighted and aligned with the gunner, pilot helmet sights and TSU. Last, the test set guided missile systems tests the functioning of the TOW missile weapons subsystem, and adjustments are made for optimum accuracy.

Both the Army and Bell conduct flight tests following aircraft quality inspection and ground runs. Missile firing simulations also are made during these test flights.

Any discrepancies are repaired before the ship is sent to the paint shop for infrared suppression paint and markings.

This helicopter, the Army's first airborne "tank killer," is truly a U.S. Army Materiel Development and Readiness Command (DARCOM) success story. Participating commands for the Cobra/TOW include Missile Materiel Readiness Command (MIRCOM) for TOW missile and 2.75 inch rockets; Armament Materiel Readiness Command (ARRCOM) for turret system and guns; and Electronics Command (ECOM) for the avionics.

Like some bionic marvel, outfitted with new muscles and firepower, the Cobra/TOW is ready to take its place as a lethal new member of the Army's combined arms team.

PRACTICING — Now deployed to our forces in Europe, this modernized Cobra/TOW makes a practice firing run over a range in Germany

The following article on the Modern Air Traffic Control System explodes the Myth that radar is the all seeing eye. This explanation of what Radar can and cannot do is recommended reading for all aviators. It is reprinted from FAA GENERAL AVIATION NEWS.

E.M. MARSHMAN
FAA Air Traffic Representative
Fort Rucker, AL

MYTH- CONCEPTIONS

IT IS ONE OF those ideal weather, built-for-flying afternoons. You are cruising along VFR [visual flight rules], no clouds, no worries ... then in an instant, the unthinkable: aluminum overcast for a millisecond – a wing, a blur of numbers, another pilot's face flashes by, mirroring your horror. Then he is gone as quickly as he came, leaving stillness and empty blue skies in his place.

You have come face to face with a pilot's nightmare, a near midair collision, and you will never be the same again. It is frightening. You are weak, you are scared, your hands are trembling. Then you feel angry and keep getting angrier – you grumble: *They spend millions on exotic ATC [air traffic control] radar, everyone knows, but there was no warning, none of the "advisory service" advertised. They can program computers to read an aircraft's altitude and flight number without a word being spoken. But they didn't warn you — or the other guy, presumably, that you were dead on target for an aerial smashup. What's wrong with this elaborate, expensive system, anyway?.*

The answer is that nothing is wrong with the modern air traffic control radar system, except possibly the airman's conception of it, what it can and cannot do. The continuing development of more sophisticated and automated equipment has given rise to the notion among some pilots that controllers are watching their every move enroute, and will always be able to warn other aircraft – particularly those flying IFR [instrument flight rules] – of their presence. This is the misconception that can kill you.

The adoption of radar into air traffic control brought with it a series of increased capabilities which have continued over its 20-year history. From the earliest days, when radio operators had to guess at locations, times and speeds of aircraft, we have gone through "raw" radar to transponders to modern computer-augmented machinery that can spit out a wealth of information on command, right on the controller's scope.

These new radar/computer capabilities have unquestionably enriched the capabilities of the airway system and brought us closer to the much desired day when collision avoidance for virtually all aircraft will be practical. But the glowing wonders of each new radar or its added capabilities encourage some of us to overlook the fact that current radar is *not* all-encompassing in its coverage, does *not* pick up all aircraft at all times, and is primarily concerned with the separation of IFR traffic.

Originally developed during World War II, radar (radio detection and ranging) had as its intital purpose not the separation of aircraft, but detection of enemy aircraft. (See "The Big Eye," *FAA GENERAL AVIATION NEWS*, August 1975.) Later developments resulted in radar being used for the positioning of aircraft. Fighters were joined up with the bombers they protected in this way, and many other uses were found for radar. Most of the research aimed at improving the outer range, ignoring the "ground clutter" – the undesirable returns from nearby trees, fences, etc., which covered the center of the scope.

After the war ended and radar found its way into air traffic control, ground clutter became an increasingly serious problem for terminal radar. Some of today's most sophisticated black box circuitry is aimed at reducing this phenomenon. Modern radar does a magnificent job compared to the old days, but clutter is still there. One way of reducing it to a minimum results in weakening radar's sensitivity to certain distant aircraft targets. The person affected in this trade-off is the pilot flying an airplane whose radar-reflecting properties are weakest. This group includes many small general aviation airplanes flying VFR without active transponders. In some situations these aircraft are not "painted" on the radarscope, even though they are within range of the transmitter.

Some pilots think of IFR as a kind of security blanket. They say to themselves, "I'm on an IFR flight

plan; therefore, the air traffic service is going to tell me about all the traffic I might encounter." So they settle back in their seat in imagined safety.

Who is Responsible

The fact is that when operating in VFR conditions, regardless of flight plan, *responsibility for seeing and avoiding other traffic rests with the pilot, not the controller*. Civilian radar was developed primarily for the separation of IFR traffic from other IFR traffic. That is still the controller's prime responsibility, although he will also assist VFR traffic as much as time and facilities permit, calling the pilot's attention to any known potential problem or immediate hazard. Radar advisory service for aircraft is specifically designated as a duty that follows the priorities of separation, safety advisories, and other required controller actions, to be performed on a workload permitting basis only. Furthermore, at any given time the controller may not be getting any return from your aircraft – or from your potential traffic.

But, you ask, *what about that VFR day when you were level at 4,500 — certainly high enough to be in coverage — and Center missed telling you about the T-38 that nearly skewered you? Traffic was light, so you know the controller should have had time to help you.*

Believe it or not, there are days when the weather is "good" for flying, but maybe not so good as far as radar is concerned. Wind, temperatures aloft (particularly when inversions are present), dewpoint spread and clouds can all have effects on radar that produce clutter, often right where you or your traffic are. In addition, the angle at which the radar antenna is tilted can result in some traffic not being seen at certain altitudes. Statistics show that the bulk of IFR traffic – the kind Center radar is primarily interested in, remember – spends most of its time at relatively high altitudes while enroute, so that is what the enroute radar is designed to see.

In terminal areas, the heavy traffic areas are within 30 miles of the airport at altitudes varying with the location; again, the radar is focused for the area of greatest use. At 40 miles out your are in all likelihood within range of the radar signals, but the controller's scope may only be displaying targets closer in. Another factor to keep in mind is that there is virtually always a cone of non-coverage directly overhead the radar antenna. All these things leave some rather wide open airspaces where there is no VFR radar coverage at many altitudes.

Certain kinds of general aviation aircraft are detected by radar with more difficulty than are others. Smaller airplanes; those made in great part of materials other than metal; aircraft without propellers; and slow moving craft all have less reflecting

What instructors have been preaching for years is still true: the only device that will ever eliminate VFR midairs is the eyeball, mounted on a constant-swivel, ever-thinking head

ability than others, resulting in less return of energy to the radar antenna. Consequently, the primary targets they produce are weak or often nonexistent. An airplane also presents less of a target to the controller when it is flying directly toward, or directly away from, the radar antenna.

Weather Radar

The airman's oldest adversary – weather – often enters into the picture. One of the current uses of radar, other than air traffic control, is in weather observation and forecasting, and weather returns tend to blot out aircraft. True, controllers can lessen to some extent the strength of weather returns, but this ability is not absolute and often times it is desirable to display weather for use in vectoring aircraft around rough areas or storm cells. Other aircraft may be "wiped off the scope" by this display.

In short, the concept of 100 percent radar coverage has to be understood in terms of stated goals, present and future. Questions put to FAA [Federal Aviation Administration] "Listening Sessions" reveal that some pilots believe any time they hear "Radar Contact" the controller has taken over all separation responsibilities. At the very least, these pilots believe all air traffic in the area is shown on the controller's scope. This assumption can be a fatal error – for any of the reasons given earlier. Radar does not protect him from unidentified aircraft or those which may not be showing up clearly on the radarscope, such as VFR traffic that has blundered into an IFR environment.

Radar advisories are an infinitely useful aid in helping the VFR pilot maintain his own separation, but they are not to be regarded as evidence that a controller has taken over responsibility for such separation.

What can the pilot do to increase the protection available from radar?

• Much of the problem could be solved by the acquisition and use of a transponder. If you have never visited an air traffic facility with radar, do so and see on the scope the difference between a transponder reply and the blip from a non-equipped light aircraft. The contrast could surprise you – the typical transponder ident "slash" is many times the size of the small dot that represents the non-equipped airplane. Transponders make the size of the airplane irrelevant; transponder replies are the same size for a 747 and for your *Cherokee*.

• If you have a transponder, use it. That is what you bought it for. Many pilots turn the transponder off when leaving terminal areas to "save" it or lengthen its operating life. There are two dangers in this practice: one is the weaker reply enroute that makes you less visible on the controller's scope, and the other is the possibility of forgetting to turn it on at your destination area. By the time the destination controller asks if you can "squawk," it is long past the time that you should have been using the extra help of a transponder to show all your progress through busy airspace. It is true that you might not be sending a signal enroute if you get out of an area of radar coverage, but what is wrong with leaving the set turned on to get you back on the scope as soon as you again enter coverage? Another advantage is that the target generated by the transponder does not easily get lost in clutter, between antenna sweeps or precipitation returns.

Air traffic controller scans scope to prevent possible midair. However, the ultimate responsibility for seeing and avoiding other aircraft during VFR flight rests with the pilot

• You can help the radar controller help you by not adding to his workload unnecessarily when he is in the process of identifying your target. Remember that he may be looking at many unidentified blips on his scope. Knowing where you are at all times simplifies the task of establishing radar contact – and shortens the time when you are present as an "unknown."

Like all human-devised systems, the air traffic control system is not without fault or the possiblity of error. But if you should happen to find yourself startled by the sight of another aircraft flashing past at uncomfortably close quarters, before you start condemning the system you might want to review honestly how well you have been carrying out your own responsibilities for the safety of your aircraft and its occupants.

Maybe it's time to throw that old security blanket out of the cockpit.

VIEWS FROM READERS

Sir:

I am an aircraft mechanic in the U.S. Air Force and, privately, a free lance inventor.

After reading the article, "After The Engine Fails, What?" which appeared in the April 1977 *DIGEST*, I immediately came up with one solution to the problem of what could be devised for emergency procedural flight after the engine fails. I know that this mechanical device will work, if the DOD is willing to finance the development of the device for helicopters. I am in the process of turning the sketches over to the Suggestion Committee at my base. If you would like more information, including sketches, please reply as soon as possible.

SRA Joseph T. Hinkson
Box 2259
Griffiss AFB, NY 13441

Sir:

Reflect with me for a moment back to the period 1968-1970. The war is on in Southeast Asia. Army aviation is at its highest peak. It seems as though everyone is after aviator wings. People are waiting a month or more to begin primary flight training at Fort Wolters, TX. The Army Aviation Schools at Ft. Wolters and Ft. Rucker, AL are filled far beyond normal capacity. The skies are crowded with helicopters. In 1968 alone six mid-air collisions occurred over Fort Rucker.

Waiting lines are long everywhere. Even the Graves Registration unit in Long Binh has a backlog of Infantry, Armor, aviation and others. Rumors have it that aviators outnumber many of the other types of service members not returning intact and whole.

There always has been a certain "glory" factor related to flying, especially during wartime. Many aviators fancy themselves as another Eddie Rickenbacker, Red Baron or Jimmy Doolittle – flying aces, superstars in the sky, famous for causing death and destruction while cheating the Grim Reaper themselves.

Learning to survive, while flying in Vietnam, was not always glorious; more often than not it was frustrating. The forward edge of the battle area was at your front door, back door and all over your area of operations. Not quite like flying from some obscure airfield in England, from which the heroes took off, flew the channel, dropped bombs, made strafing runs and then returned to merry old you know where. In Vietnam you were more likely to takeoff, fly across the base camp perimeter, drop grunts, launch rockets and minigun fire and return to refuel and rearm. Then you'd again fly across the perimeter fences and bangalores to retrieve the Infantry platoon for lunch or dinner. On special occasions you may fly 35 klicks in any given direction to accomplish these amazing feats.

Under these conditions, Army aviators – more specifically helicopter pilots – could normally expect to fly 800, 1,000, 1,200 or more hours during their first visit to the war zone. Mostly though, it kept the helicopter pilots a lot sharper and more knowledgeable about themselves and their helicopter than they were taught to be in flight school. When statistics give you a shorter life expectancy than an Infantry type, one becomes knowledgable in a hurry.

With this in mind, a person may ask, "why fly?" For the glory of dying young? To join in a camaraderie of the dashing, derring-do days of yore? For the money? Why?

We are no longer involved in armed conflict, so what enemies are we concerned with? There are trees, wires and various other enemies of a terrain nature. Annual Class II physical exams, high blood pressure and failing eyesight are only moderately hazardous to your health when compared to B-40 rockets, SA-7 missiles and the like.

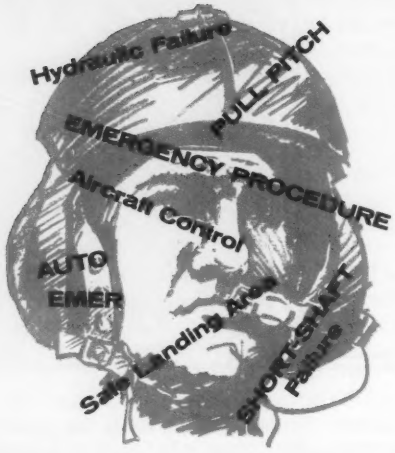
Derring-do? It appears so when one considers the aspects of nap-of-the-earth flying – and at night yet! This is a far cry from flying 2 miles high, and airport to airport, as done by the fixed wing types.

Then there are those unfortunate few who rely on flight pay for fun and games, car payments, boats and a myriad of different ways to spend "extra" money. A sorry state indeed for the dashing, daring, hero-type to be resigned to. Risking life and limb in peacetime only for the extra money does nothing to enhance the image of the Army aviator. So why fly?

Fly because you love flying! Live to fly! Know yourself and your aircraft. Refrain from relying on past accomplishments, be devoted to the safety of it all. Combat readiness flying for 80 hours annually may not be completely conducive to aviation safety, but when it's all you have, you must love flying even more than years past.

If not, for all concerned, grab yourself a desk and fly it, although you may lose your flight pay. If the pay is the only reason you fly – don't!

CW2 Wayne L. Jeppson
Dept of Academic Training
U.S. Army Aviation Center
Ft. Rucker, AL 36362



WHAT DO YOU DO? WHY DO YOU DO IT?

Continued from page 35

cally operated. If the governor were allowed to remain in AUTO, and an electrical failure occurred, you would be unable to change to the EMER mode.

Let's now go one step further. Let's look at that phrase "when conditions permit" – and also if they don't.

Q. You're flying NOE underneath a 100- or 200-foot ceiling. You've just had a high-side governor failure. What are you going to do?

A. If you act instinctively, you're going to pull pitch to try to control rpm. That's also the first step in the published emergency procedure. However, you may inadvertently go into the overcast. In research for this article, this emergency was given to numerous personnel in the SFTS without their prior knowledge. The average altitude gained was in excess of 400 feet, with climb rates as high as 2,200 fpm, before the situation was brought under control. Obviously, conditions in the SFTS versus a Huey flying NOE are too different for a direct correlation. However, the point that you're going to gain considerable altitude is valid. Can you handle the high-side governor failure and an inadvertent IMC situation at the same time? It would be safe to say that you've got your hands full!

If you do maintain control of the situation and continue with your inadvertent IMC procedures, the situation will not permit autorotation to get into an emergency governor position. Therefore, you will be flying for a considerable amount of time with manual control of rpm in the AUTO governor position. What about that main metering valve?

If you thought about this situation before it ever happened, you may have considered that the safer way out is to close the throttle and autorotate as best you can. This procedure is not in the operators manual, but paragraph 4-1C(3) of the UH-1 operators manual and paragraph 4-2 of the AH-1 operators manual does state: "The most important single consideration is aircraft control. All procedures are subordinate to this requirement." Further, FM 1-1, page 20, addresses in-flight emergency procedures during terrain flying. "Emergency procedures should be established by each crew prior to conducting terrain flight. Due to the critical shortage of time for the crew to react to an in-flight emergency, each member of the crew should know what he must do in the event of an emergency."

While we're on the subject of high-side governor failure, let's look at the situation further.

Q. How can you tell the difference between a high-side governor failure and a short-shaft failure?

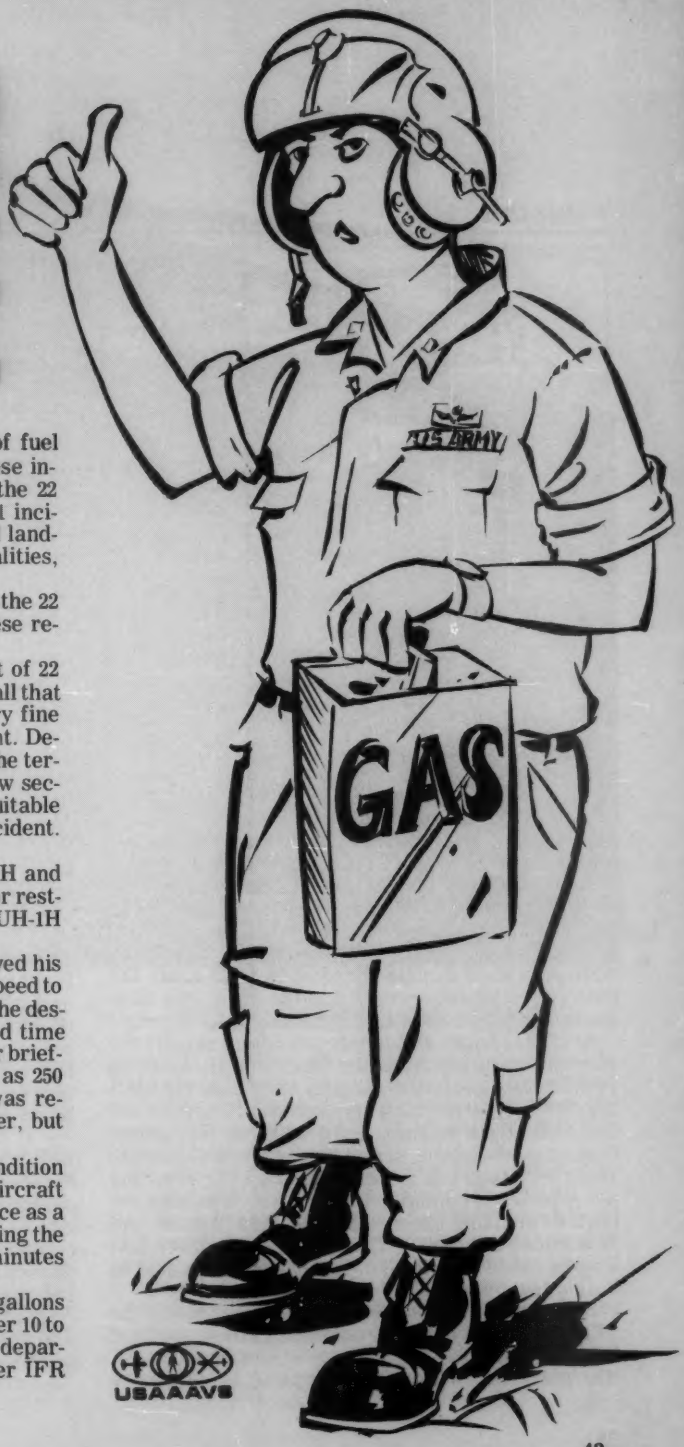
A. The initial indications for a high-side governor failure are that both engine and rotor rpm (N2) needles will climb. The high-low rpm light will also illuminate. If it's a short-shaft failure, the engine rpm needle will climb, while the rotor rpm needle will fall. The high-low rpm light will illuminate, and the low rpm audio will activate. The biggest problem with these emergencies is that the published emergency procedures require opposite actions. For one you should increase collective and for the other you should enter autorotation.

What happens if you misinterpret the emergency? If you react to a short-shaft failure by increasing collective, your rpm will bleed off rapidly, with possibly catastrophic results. If you enter autorotation for a high-side governor failure, you have given up your chance to land in a good area when you actually have the capability of flying to a better area if necessary.

Obviously, the key to all of these questions is, first and foremost, know and understand the emergency procedures. But it is just as important that you consider the conditions in which you find yourself. As we enter into more and more diversified modes of flight, the need for recognition of emergencies and the ability to analyze the situation in which we are flying becomes even more critical. During safety meetings, the unit's mission and those emergencies that could occur while performing that mission should be discussed so all aviators will develop a better understanding about them. Although not all emergency procedures can be practiced in the aircraft because the situation cannot be safely created, the SFTS provides an excellent vehicle for recognition of emergencies and the application of corrective procedures.

The time has come to eliminate the "Peter Pilot" syndrome and replace it with a well trained professional at the controls. A deeper understanding of your aircraft and what to do in emergencies is a step in that direction.

a fine LINE



The USAAAVS data bank lists 22 cases of fuel exhaustion for a 4-year period. Eleven of these involved faulty fuel gauges. A breakdown of the 22 cases shows 4 major and 1 minor accident, 1 incident, 2 precautionary landings, and 14 forced landings. Surprisingly enough there were no fatalities, only 1 major injury, and 3 minor injuries.

Fixed wing aircraft accounted for only 5 of the 22 fuel exhaustion cases. However, three of these resulted in accidents.

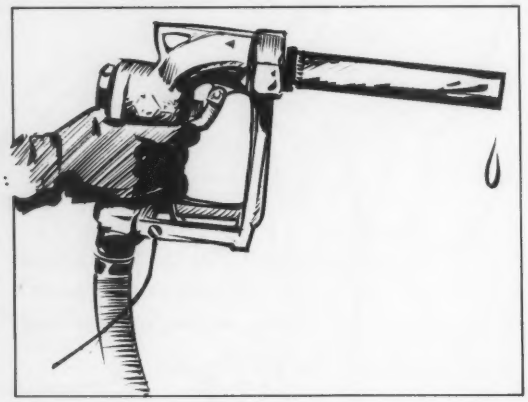
You may argue that 4 major accidents out of 22 fuel exhaustion cases in a 4-year period is not all that alarming. But remember that there is a very fine line between a forced landing and an accident. Depending on the phase of flight you're in and the terrain you're over when your fuel is gone, a few seconds can make the difference in reaching a suitable forced landing area or having a major accident. Let's look at some actual cases ...

• The crew departed home base in a UH-1H and arrived at their destination the next day. After resting for two days, they prepared to ferry a UH-1H back home.

The pilot filed an IFR flight plan and received his weather briefing. He determined his true airspeed to be 84 knots, total distance to facility serving the destination as 129 nautical miles, and estimated time en route as 1 hour and 30 minutes. His weather briefing listed the winds at his selected altitude as 250 degrees at 25 knots. An alternate airfield was required, based on forecast destination weather, but he did not file for an alternate.

The aircraft log book had a circle red X condition for an unreliable fuel gauge, restricting this aircraft to 2 hours flight. Based on the pilot's experience as a maintenance officer and his observations during the 30-minute test flight, he listed 2 hours and 30 minutes of fuel on board the aircraft.

The crew topped off their fuel tank with 52 gallons of JP4. They departed the airfield at 1534, after 10 to 15 minutes ground runup and hovering for departure. Their entire flight was conducted under IFR conditions soon after departure.



After departing they were dropped from radar and advised to contact destination at intersection A. The pilot reported intersection A to destination tower who directed them to hold at intersection B at 1736 (2 hours and 2 minutes after takeoff). Sometime shortly before or just after they reached intersection B, the winds increased to about 40 knots. The crew never became aware of this problem. They thought they were having a VOR problem because they did not receive station passage indication in the proper time frame based on their estimated ground speed of 60 knots. They never physically made a ground speed check. The destination controller at that point computed their ground speed at 36 to 37 knots but didn't question the crew because he knew very little about helicopters and thought it might be normal.

At 1750 (2 hours and 16 minutes after takeoff) the aircraft was cleared to destination VOR and was instructed to hold there. Shortly after entering holding, the low fuel warning light came on. The crew did not believe the warning light with the fuel gauge indicating 470 pounds of fuel, even though the unreliable fuel gauge had been written up. The crew did not report this condition to the tower. The pilot reported departing intersection B at 1756 (2 hours and 22 minutes after takeoff) and asked the tower how long he would have to hold. They told him it would be only a few minutes.

At 1810 (2 hours and 36 minutes after takeoff) the pilot told the tower that he only had 20 minutes of fuel left on board and requested a DF steer to the airfield. The tower advised them of the terrain elevation in their area and gave them a DF steer to the airfield, a direction of 320 degrees. The pilot received permission to descend and find a place to set the aircraft down. At terrain altitude (1,400 feet indicated) the aircraft was still IFR but the crew could occasionally see treetops directly below. Ten minutes later (2 hours and 46 minutes after takeoff) the engine quit and the pilot zeroed his airspeed and cushioned the aircraft into the treetops.

The crew disregarded a circle red X condition for an unreliable fuel gauge which restricted the aircraft to 2 hours flight duration. The pilot figured his reserve of 45 minutes as part of the 2 hours and 30 minutes fuel when in fact his reserve should have been part of 2 hours fuel. This would have restricted his flight to 1 hour and 15 minutes which had to include flying time and approach to an alternate airfield. Based on this, the flight should not have left the airfield.

• An OH-6 engine failed after 45 minutes of flight and the pilot made a successful forced landing. The low fuel warning light did not illuminate. Aircraft records indicated the fuel quantity gauge was inaccurate. The 2408-13 showed the fuel tanks contained 52 gallons, and a visual check during preflight verified fuel in the filler neck.

A line mechanic, unfamiliar with the OH-6 crashworthy fuel system, attempted to fuel the aircraft without pulling and locking the antispill valve installed in the filler neck. When the aircraft wouldn't accept fuel, the lineman thought it was full. The 2408-13 showed that the tanks were full and no fuel had been added. The aircraft had no fuel leaks and all systems operated normally. The engine-driven fuel pump was changed in the field, but the old pump was found to be operating normally on the test bench. The aircraft was fueled with JP4 IAW proper procedures and operated normally for 2 hours and 45 minutes.

• A chopper engine quit due to fuel exhaustion while the aircraft was being hovered for parking at a cross-country destination. Thirteen minutes later another helicopter had engine failure while hovering into the same parking area. Failure was again caused by fuel exhaustion. Fourteen minutes later a third helicopter was entering the same parking area and ran out of fuel while still at a hover.

All three aircraft were from the same home base. And it is conceivable that all three could have ended up in the same trees or same swamp.

• An OH-58 pilot figured he would have 15 minutes

RON in the boonies — for lack of fuel

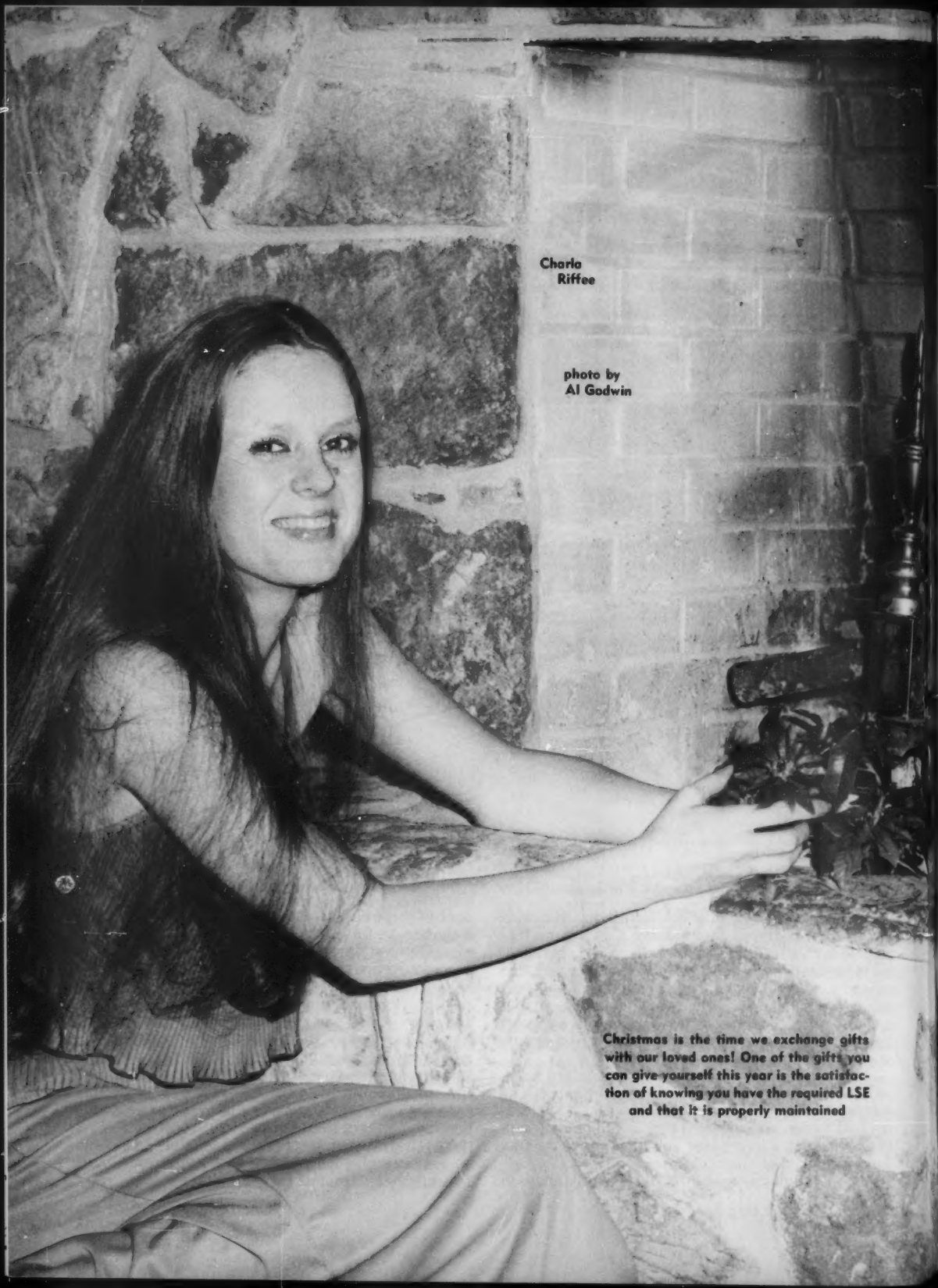
fuel reserve upon arrival at his destination. He knew that AR 95-1 required him to have a 30-minute fuel reserve for VFR flight. Further, he relied primarily on his fuel gauge, the least reliable fuel consumption indicator. The pilot was within 5 minutes of an Army airfield when his low fuel warning light came on, but he decided to continue to his destination approximately 15 minutes away. Minutes later, the engine failed and the pilot was forced to land.

• Investigation of an engine that quit during autorotation revealed fuel exhaustion as the cause. The instructor pilot knowingly took off with an inoperative fuel gauge and with less than a full load of fuel. He was in such a hurry that he did not have the fuel gauge repaired or the tank topped off.

With only minor alteration of the circumstances in each of these cases, all could have ended in disaster. Reliance on faulty fuel gauges and improper fuel management, preflight, planning, and refueling procedures are the factors most often found in fuel exhaustion cases.

Do you know the fuel capacities and consumption rate with varied power settings for the aircraft you fly? Do you always check your fuel before each flight and carry an adequate fuel reserve? Do you constantly monitor your fuel consumption by elapsed time or do you rely on the fuel gauges?

As shown here, there's a fine line between a forced landing and a major accident in out-of-gas situations. The importance of fuel management must not be underemphasized. Regulation requires it, professionalism demands it ... let's have it.



Charla
Riffee

photo by
Al Godwin

Christmas is the time we exchange gifts with our loved ones! One of the gifts you can give yourself this year is the satisfaction of knowing you have the required LSE and that it is properly maintained

PEARL'S

Personal Equipment & Rescue/Survival Lowdown

If you have a question about personal equipment or rescue/survival gear, write Pearl, DARCOM, ATTN: DRCPO-ALSE, POB 209 St. Louis MO 63166

Securing Survival Kits In Aircraft

My unit has the OH-58 Kiowa aircraft. Where do I secure or store my aviation life support equipment (ALSE) when the aircraft is loaded with pilot and three passengers?

The OH-58 and also the AH-1 Cobra aircraft do not have space dedicated to storage of ALSE. We consider this a design deficiency which may compromise the safety of aircrewmembers in an accident. The Army is attempting to correct this problem on new aircraft procurements. Aircraft procurement specifications must be written to include provisions for ALSE.

The *suggested* space to secure ALSE in the OH-58 is the space between the two rear seat passengers. For those AH-1 units, limited space is available under and in the rear of the pilot seat.

Insulated Flyer's Boots

I understand the FWU-3P insulated flyer's boots are authorized per CTA 50-900 for aircrewmembers in climatic area V. What is climatic area V, and where can I find the national stock numbers (NSNs) for these boots?

There are seven climatic areas or zones. Climatic area V is warm or hot summers (more than 68 degrees Fahrenheit (F)), and cold or very cold winters (below 32 degrees F). All climatic zones are described in detail in Appendix D of CTA 50-900.

The NSNs and boot sizes are listed in SB 700-20, Chapter No. 8, pages 8-9, under line item CO7743. Your requisition should be submitted to S9T (Defense Personnel Support Center, Director of Clothing and Textiles, 2800 South 20th Street, Philadelphia PA 19101).

"X" Rated Movies

Now that we have your attention, "X" stands for X-cellent. These are video tape movies that offer outstanding training advice to aircrewmembers. Our current recommendations are:

1 - Army Aviation Oxygen Systems – No 6A-011-0314-B

2 - Safety Briefing by CPT Charles Nowlin – No P-572

3 - SPH-4, the Aviator's Protective Helmet – No 2C-011-0693-B

These tapes are available from the Commander, U.S. Army Aviation Center, ATTN: ATZQ-TD-TS-ETV, Ft. Rucker, AL 36362, or call Mrs. Tomlin, AUTOVON 558-6205 or 558-4388.

Now for the catch – to obtain the training tape, a blank video tape must be furnished to the above address for each television tape requested.

Aviation Unit ALSE Shops and Training

We are trying to set up an aviation life support equipment section and need any information available. Also, what training is available in this area? Is there a military occupational specialty (MOS) for an ALSE specialist?

This is not from Ripley's "Believe It Or Not" but the MOS for an ALSE specialist is still on the move. Some aviation units have taken the initiative and have established ALSE shops to store and maintain their unit equipment. Some of these units have used the Air Force ALSE schools at Chanute Air Force Base, Rantoul, IL, to train selected enlisted personnel and the ALSE management course at Fairchild Air Force Base, WA, for their warrant and commissioned officer personnel.

Captain Mike Gourques and CW3 Richard Wells, 156th ASA Aviation Company, Ft. Bliss, TX (AUTOVON 978-8008 or 8433), have established a model ALSE shop and can give you some valuable information. I also have requested the U. S. Army TRADOC proponent for the Army formal schools to include data on the U. S. Air Force and Navy ALSE training courses in the Army schools catalog. Additionally, letters are being sent to all FLIGHTFAX addressees notifying them of these ALSE schools.

Flares, Foliage Penetrating

The flares we have on hand have a 2-year service life. Do we dispose of the flares after this period of time?

This one is hot off the press. The life of the foliage penetrating flares, NSN 1370-00-490-7362, has been extended to 4½ years from date of manufacture. Technical Manual 55-8465-206-23 will be changed to reflect this new extension.

ATC action line

UNITED STATES ARMY AIR TRAFFIC CONTROL ACTIVITY

WHAT RECENT CHANGES have occurred in the U.S. Air Force Notice To Airmen (NOTAM) System?

On 25 August 1977 several actions were initiated concerning NOTAMs that affect Army airfield operations/aviators. These are:

- The USAF extended its NOTAM coverage to include all Army, Army National Guard and Army Reserve airfields/heliports. This means that information which meets NOTAM criteria will be carried on the USAF system, if it has been sent to the USAF Central NOTAM Facility (USAFCNF).
- The USAF NOTAM System now carries all Federal Aviation Administration (FAA) D series and FAA Flight Data Center (FDC) NOTAMs for those civil locations published in the instrument flight rules (IFR) Supplement. A NOTAM D is one that is given distant dissemination throughout the FAA network and is stored in a data base and repeated over teletype hourly until cancelled. A FDC NOTAM is a change to published flight data and is regulatory in nature. It is given all circuit distribution on a one-time basis and applies to instrument approach procedures, aeronautical charts and selected flight restrictions.
- The USAF began an automatic response to query (ARQ) test program for NOTAMs. A description of this program is published in the flight information publication (FLIP) AP/1.

How does the USAF NOTAM System operate?

The USAF NOTAM System is managed by a Central NOTAM Facility (CNF) located at Carswell AFB, TX. NOTAMs are disseminated via the Air Force Weather Network, commonly called COMEDS which stands for CONUS (Continental United States) Meteorological Data System. NOTAM information is provided on a daily summary which contains Special Notice NOTAMs, Enroute Special Notice NOTAMs and Aerodrome NOTAMs. This summary is transmitted daily at 1630Z. At each half hour thereafter, until the next daily summary, an hourly update is transmitted. All new NOTAMs or revisions are published on the hourly update. Each update supersedes the previous issue so only the current one should be displayed. A check of the daily summary and current hourly update provides the latest NOTAMs. At locations which have Air Force weather detachments or COMEDS send/receive equipment NOTAMs may be obtained by ARQ. The ARQ codes are listed in the IFR Supplement and it is the aviator's responsibility to provide the required codes to the weather personnel or operators of the COMEDS equipment. A hard copy of the NOTAMs requested then will be provided to the aviator. The ARQ data base contains the same information that is transmitted via the daily summary and hourly updates, so either method will provide required NOTAMs.

How do operations personnel disseminate or receive NOTAM information?

Several methods may be used as follows:

- Send/receive via COMEDS terminal equipment. Several airfields have this capability and are using the USAF NOTAM System.
- Send/receive via message through base telecommunications centers. Message address: CHIEF USAFCNF CARSWELL AFB TX. Daily summaries and hourly updates can be obtained via automatic digital network (AUTODIN) through base telecommunications centers.
- Send/receive through another base that has COMEDS equipment. Prior coordination and formulation of letters of agreement should be developed between appropriate base operations. If the only way to obtain a NOTAM briefing is via telephone, instructions on how to do it should be displayed in an easily accessible location for all aviators.
- Send through U.S. Army Air Traffic Control Activity (USAATCA) Aeronautical Services Office by message, letter, communication card, or telephone AUTOVON 284-7773. Since 15 November 1977 NOTAM briefings have been provided during normal duty hours Monday through Friday except holidays.
- Transmit direct to USAFCNF by telephone, AUTOVON 739-7841, with a message followup. Use this method as a last resort. AUTOVON precedence "IMMEDIATE" is authorized.
- The Army has 31 locations with COMEDS equipment operating on the USAF NOTAM System and 17 additional locations programed to receive equipment during fiscal year 78.

How does an aviator obtain NOTAMs?

At an airfield that maintains a USAF NOTAM file, check the daily NOTAM Summary and hourly update. These airfields are identified in the IFR Supplement by the symbol ◈ . The USAF Summary and hourly update will provide Enroute Special NOTAMs, Military Aerodrome NOTAMs, FAA NOTAM D series and FAA FDC NOTAMs on

Army's First Air To Air Symposium

When BG Carl Hutton commanded Fort Rucker in 1955, he had a difficult time finding 10 people who were experts to any degree on helicopter armament — let alone any other aspect of helicopter combat operations. But things have changed considerably in the past 22 years.

On 25 October, MG James C. Smith, Fort Rucker's commander, welcomed more than 180 representatives from the Navy, Air Force, Marine Corps and Army to the Army's first air to air symposium. Most were experts or potential experts in some aspect of helicopter combat operations.

General Smith cited the air to air symposium as one of the most important get togethers to date. He noted that while there has been interest in this area for years, previous meetings had not brought the entire military community together to discuss procedures, doctrine, hardware and other air to air matters.

Presentations were made by representatives of all of the Armed Forces from 1300 Tuesday, when the meeting was opened until noon the next day. General Smith then convened a panel of 10 representatives to answer questions from the floor. Discussions were open, lively and constructive — covering many significant air to air problem areas. The meeting was hosted by Colonel "Doc" Bahnsen, the Training and Doctrine Command (TRADOC) System Manager for the advanced attack helicopter (AAH).

Colonel Bahnsen reflected the overall enthusiasm of the group when he said that a lot of misconceptions about air to air were laid to rest during the meeting. He added that a followup air to air symposium is tentatively set for April 1978. Details will be announced later but information can be obtained by calling or writing the AAH TRADOC System Manager's office at Ft. Rucker at:

Commercial 205 255-5171 AUTOVON 558-5171

Address: Commander
U.S. Army Aviation Center and Fort Rucker
ATTN: ATZQ-TSM-A
Fort Rucker, AL 36362

the civil airfields published in the IFR Supplement. Local NOTAMs (FAA NOTAM L and USAF Airmen Advisories) are provided to the aviator by local air traffic control (ATC) facilities, Airport Advisory Services or assigned FAA Tie-In Flight Service Stations for the departure/destination airfield. These local NOTAMs are not given wide area dissemination over the FAA and USAF NOTAM Systems. They will not be found on the appropriate NOTAM Summaries. The FAA also publishes NOTAMs that will be in effect for more than 7 days in Part 3A of the Airman's Information Manual (AIM). These NOTAMs will not be found on the teletype NOTAM Summaries so AIM, Part 3A, must be checked if going to a civil field. At airfields that do not maintain an Air Force NOTAM file, it is necessary to obtain a telephone NOTAM briefing. The preflight weather/NOTAM procedure section of the IFR Supplement provides guidance in obtaining briefings by telephone.

Readers are encouraged to send questions to:

Director
USAATCA Aeronautical Services Office
Cameron Station, Alexandria, VA 22314

Copies of this poster are
available by writing:
Commander
U. S. Army Agency for Aviation Safety
ATTN: IGAR-PG
Fort Rucker, AL 36362

USAAAVS

WALK AROUND!

don't lose your head to save a step